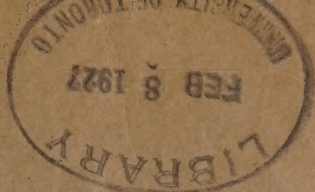


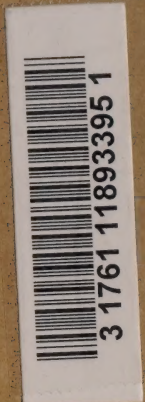
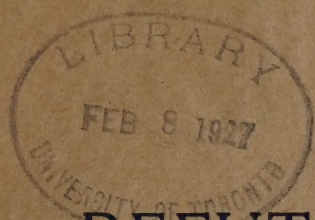
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RE
"MURRAY REPORT" ON ELECTRIC UTILITIES



REFUTATION OF UNJUST STATEMENTS

CONTAINED
IN A REPORT PUBLISHED BY THE

National Electric Light Association
ENTITLED

"Government Owned and Controlled Compared with
Privately Owned and Regulated Electric Utilities
in Canada and the United States"

RESPECTING THE

Hydro-Electric Power Commission of Ontario



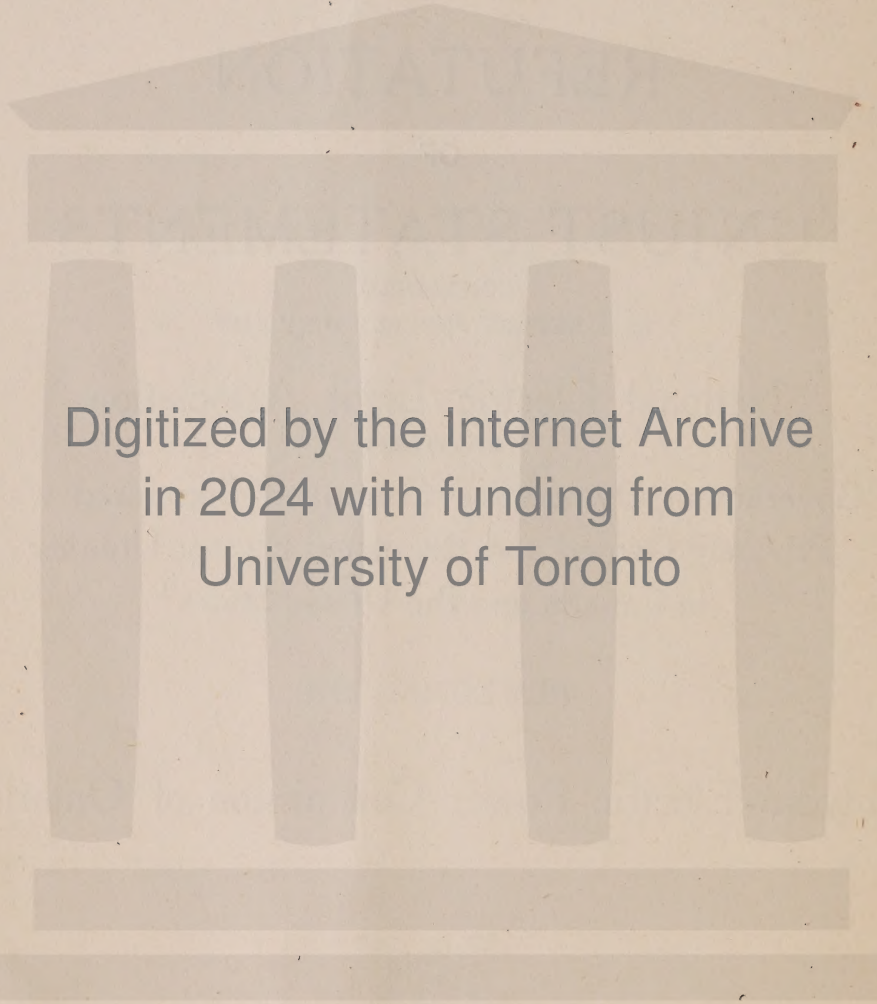
TORONTO—1922

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FOREWORD

THERE has recently been issued a voluminous printed report under the title "Government Owned and Controlled; compared with Privately Owned and Regulated Electric Utilities in Canada and the United States." This report is popularly known as the "Murray Report." Even a cursory examination of its contents reveals the fact that its real purpose is evidently to undermine, if not to destroy, public confidence in public ownership and to this end an attempt is made in it to discredit the success of the municipally-owned, hydro-electric power and light undertaking operated for Ontario municipalities by the Hydro-Electric Power Commission.

From an explanation presented in the report it is learned that it was prepared by a United States firm of consulting engineers—Mr. W. S. Murray and Mr. Henry Flood, Jr.—acting under instructions from the National Electric Light Association through which organization the report has been distributed to the public. The report itself is signed by W. S. Murray, who personally received instructions from the National Electric Light Association. This Association is antagonistic to public ownership. Of himself, Mr. Murray, in his report says, "I have never subscribed to governmental ownership of electric utilities in the United States."

In the introductory portion of his report Mr. Murray records that he received a commission "from the National Electric Light Association, to investigate and report on the electric utility systems as operating in the United States and by the Hydro-Electric Power Commission of Ontario." Mr. Murray also states: "that the electric utility officials in the States were very much at sea regarding the facts of the Hydro-Electric Power Commission's policies and operations," and that consequently it is his desire to set forth the facts "so that they would be correctly interpreted beyond peradventure of doubt."

The results of Mr. Murray's efforts have been published and a large and widespread distribution of his report has been made throughout both the United States and the Dominion of Canada.

An examination of Mr. Murray's report shows that some eighty-five per cent of its contents consists of information epitomized, or otherwise arranged by him from data supplied from the records of the Hydro-Electric Power Commission of Ontario.

The report of Mr. Murray effects comparisons between "privately-owned" electric utilities and the Hydro-Electric Power Commission of Ontario, and purports to do so in an "impartial and exhaustive" manner. Information relating to the Commission was unstintingly supplied to Mr. Murray and, as just intimated, portions of these data have been published by him in great detail. He, however, in his report, makes no attempt correspondingly to supply information respecting the private electric utilities. With regard to the private companies in the United States, Mr. Murray fails to designate adequately even the sources and limitations of many of the data which he has employed; while with respect to the private companies in Canada with which he compares the Hydro-Electric Power Commission, Mr. Murray, in response to a special request from the Chairman of the Commission, replied that the data of the private companies were given to him in "confidence" and that in this connection he must preserve the restrictions imposed upon him. He could not even submit the data to the Commission, in order to assist it in going more fully into certain assertions published in his report. It will be appreciated therefore, that although on the one hand, the reader has available the detailed evidence relating to the operations of the Hydro-Electric Power Commission, nevertheless, on the other hand, he must content himself—if able so to do—with unsupported assertions made by Mr. Murray now known to be founded upon "confidential" and unpublished data of private interests.

Although Mr. Murray's report upon the face of it bears "ear-marks" of reliability and no expense has been spared to present it in attractive form, nevertheless, Mr. Murray makes incorrect statements and representations respecting the Hydro-Electric Power Commission of Ontario and its operations, which lead to conclusions at complete variance with the facts. It is desirable, therefore, that an authoritative statement be made which shall disclose the inherent unsoundness of Mr. Murray's report.

The users of electrical energy in the province of Ontario are in no doubt respecting the actual and genuine benefits of the cheap light and power which they have so long enjoyed. It is, however, not for the citizens who understand the subject that the present statement is prepared, but rather for those in Canada or in the United States who are unfamiliar with, but who nevertheless are really concerned to know, the facts. It is believed that both in Canada and in the United States there are many interested in the work of developing, distributing and using hydro-electrical energy who would like to know the real facts relating to the subject Mr. Murray discusses, but who are unable either to take the time or to make the effort necessary to conduct an independent investigation. Even among the members of the National Electric Light Association there are, no doubt, many who would like to know definitely whether or not Mr. Murray's conclusions could satisfactorily be sustained if criticism were intelligently directed against them. There are, in Canada, some who have been unsettled by similar propaganda plausibly sent forth but devised with the express object of discounting the achievements of Ontario's municipal hydro-electrical undertaking.

In commencing this discussion it should clearly be understood that the very title of Mr. Murray's report is misleading. The phrase "Government Owned and Controlled," in its usually accepted meaning—and especially as understood in the United States—conveys a significance radically different from any which can be attached to the operations of the Hydro-Electric Power Commission of Ontario. As commonly understood, "Government ownership" carries with it the conception of political domination in the appointment of officials and other employees and in the purchase of equipment and supplies and, in addition, the view that political manipulation may be impressed upon important phases of the operations in hand. As contrasted with such a political organization it may simply be stated that the Hydro-Electric enterprise of the Municipalities in the province of Ontario is not "Government ownership." It is co-operative, municipal ownership working through the agency of independent commission control and administration and is entirely removed from political interference. Mr. Murray has not emphasized as he should have emphasized, nor has he kept to the front, this fundamental distinction between "Government ownership" as generally understood, and Co-operative Municipal ownership as expressed in the constitution and work of the Hydro-Electric Power Commission of Ontario. Had this point alone been clearly brought out by Mr. Murray, he would have required to look elsewhere than to the Hydro-Electric Power Commission for his only illustration of a "Government Owned" electric utility. It was, however, vital to Mr. Murray's presentation that, by some means, he should identify the undertaking of the Hydro-Electric Power Commission with government ownership, in order that the stigma of government ownership as commonly understood should be transferred to the unique, co-operative, municipal ownership undertaking of the Commission and thus aid in casting discredit upon the achievements of the people of the province of Ontario who have directly assumed the financial responsibility of obtaining their hydro-electrical energy at cost.

Mr. Murray states that the National Electric Light Association desired to have a report "*based on an impartial and exhaustive study.*" It is proposed in the present Refutation to show, briefly, some of the methods adopted by Mr. Murray in order to reach his conclusions and then to leave the National Electric Light Association and the Public to judge of the correctness of the charge that Mr. Murray's report is not "exhaustive," it certainly is not "impartial," and, moreover, embodying, as it does, such fallacious methods as Mr. Murray has employed, its conclusions also are necessarily unsound.

Mr. Murray has made definite statements purporting to be true but which are at absolute variance with well-known facts. He has misquoted statements, even replacing significant words therein with others. He has employed partial and misleading data, thereby arriving at conclusions which cannot for a moment be supported if the correct data be employed. He has presented grossly misleading statements respecting even physical facts within his knowledge, and he has made comparisons between entities radically different, when even a proper recognition of the real differences would have created

an impression entirely at variance with what he has represented. He has inflated costs in a manner which falsifies the conclusions. Such procedure is characteristic of the use made of much of the essential material embodied in the premises which Mr. Murray has adduced and upon which he has based his conclusions. This accounts for the worthless nature of such conclusions.

It is unnecessary in this Foreword to follow Mr. Murray through the many unjust representations by means of which he plausibly seeks to impose upon the credulity of his readers. His garbling of documentary data, his general misrepresentation respecting the operations of the Commission, his unwarranted statements relating to the concentration of industries or to the throttling of initiative, his puerile dealing with economic subjects, such as municipal taxation, the question of 'intangibles,' bonded indebtedness, and other similar features, and even his unprofessional treatment of important technical data, will all be found to be characterised by the same lack of frank and adequate consideration which is exemplified by the following specific illustrations.

In dealing with the legislation under which the municipalities carry on their electrical operations, Mr. Murray refers in rather a disparaging manner to certain broad powers which the Government of the Province has conferred upon the Commission. He states:

"It is apparent as one reads the many laws enacted that the faith of the people is in an all-wise, unerring commission which 'can do no wrong,' and legislation has been constantly passed so that the Commission is entirely free from any character of inhibition; barriers, legal or otherwise, are levelled to give free swing to the conscience and action on the part of the Commission."

In referring to certain circumstances where such broad powers as have just been intimated might be invoked, Mr. Murray contends that no suit could have been brought against the Commission "since," states he, "the Commission cannot be sued without fiat from the Attorney-General, and to date no fiat has ever been granted." Within the period from 1912 to date, *the Attorney-General of the Province of Ontario has granted more than twenty-five fiats* permitting legal action to be brought against the Commission. This statement shows that Mr. Murray has definitely recorded that which is at absolute variance with fact.

When Mr. Murray is contending in his report that the Hydro-Electric Power Commission is clothed with an "unlimited" authority which makes it, as he charges, "the sole judge of its own acts," he purports to quote the Power Commission Act. In so doing, however, he expressly omits certain all-important, qualifying words in the earlier form of the Amending Act he employs. Thus the phrase

"in respect of *which* authority *is*, by *this* Act, conferred upon it." is altered by Mr. Murray to read

"in respect of *that* authority *as* by Act conferred upon it."

By thus altering the wording of the Act, Mr. Murray creates the false impression that the jurisdiction conferred by the particular portion of the Act cited, relates to the operations of the Commission as a whole, instead of relating as it does only to certain comparatively unimportant and special features covered by the provision of the Act in question—that is, by *this* Act. These features refer to a relatively minor power of the Commission which permits it to approve of certain matters relating to the joint construction of lines on highways, and in this connection the Commission acts in the capacity of a regulatory commission. Mr. Murray's zeal to support his charge that a power of procedure had thus been "granted to the Commission, unlimited," has impelled him to such an extent that he is ready to misquote even the wording of a Statute in order to lend plausibility to his unfounded contention.

Again, when Mr. Murray is discussing rates for light and power for certain places as compared with the rates for other places served through the Hydro-Electric Power Commission, he employs data which, rightly understood, totally discredit his conclusions. Mr. Murray, for example, states that, in 1920, the street lighting cost *per capita* in the city of Buffalo was 60 cents as compared with 67 cents *per capita* in the city of Toronto. Mr. Murray, however, does not inform his readers that in Buffalo more than one-half of the total number of street lights are gas or gasoline lamps, whereas in Toronto all the street lights are electric. The significance, of course, of this omission is that Mr. Murray has taken less than one-half of the total cost of street lighting in Buffalo and then compared it with the whole cost of all the street lighting in Toronto. Had Mr. Murray used the figures necessary to effect a correct comparison then he would have had to say that, in 1920, the total cost of street lighting *per capita* in Buffalo was \$1.15 and not 60 cents *per capita* as he has incorrectly stated. Such a presentation of facts, however, would not have fitted in with Mr. Murray's argument. What is required in matters of this kind is "impartial and exhaustive study" and in an instance like that just cited Mr. Murray shows himself to be singularly incompetent to prosecute such a study.

Even with respect to certain physical facts, Mr. Murray lamentably fails to present impartially the true condition of affairs. With regard to the storage on the Nipigon river as contrasted with the storage available on the Kaministiquia river, Mr. Murray states that the Nipigon development "lacks a storage equal to that available to the Kaministiquia plant." The physical facts are that the Nipigon river has a potential storage of 4,896,000 acre-feet which with the flow of the river would yield a controlled flow of 6,500 cubic feet per second, whereas the Kaministiquia river has a storage of 547,000 acre-feet yielding, correspondingly, a controlled flow of but 1,000 cubic feet per second. Thus the potential storage on the Nipigon watershed is over nine times that on the Kaministiquia. Moreover, the ultimate power which may be developed on the Nipigon river is about four times that which may be developed upon the Kaministiquia river. In view of such facts it is

incomprehensible that Mr. Murray should state that the Nipigon development "lacks a storage equal to that available to the Kaministiquia plant" when in point of fact it does not lack, but surpasses it manyfold. Not to have directed attention to the very special features distinguishing the water power of the Nipigon river, and to have compared the Nipigon river with the Kaministiquia river, as Mr. Murray has done, is certainly not "impartial" consideration, but, rather, is an unpardonable breach of professional integrity on the part of the authors of the Murray-Flood Report.

Throughout his report Mr. Murray effects comparisons between data and circumstances which often are inherently and radically different. Not only does Mr. Murray fail to direct his readers' attention to these fundamental differences, but in some cases he actually precedes the "comparison" he intends to make, by a special discussion of differences between entities which subsequently are not involved in the comparison actually made. In such a case, unless the reader is on guard, he fails to perceive the tricky device by which his attention has been transferred from an important to an inferior consideration.

A typical example of this method as adopted by Mr. Murray, is found in the way in which he presents his comparisons of the average costs of power to the people of California and of Ontario. In discussing this subject, Mr. Murray first directs his readers' attention specifically to the advantages enjoyed by the people of the *Niagara district* in having Niagara Falls as the source of power. "This," states Mr. Murray, "should be kept in mind especially when the comparison is drawn for the California situation." He then, under the caption, "California Compared to Ontario," makes his comparison, not however, on this broad basis of California and Ontario, nor indeed between California and the only Hydro system which in magnitude is at all comparable with California, namely, the great Niagara system to which he has specifically directed his readers' attention; but between California, and, to use Mr. Murray's subtle expression, the Hydro systems "*other than the Niagara*." The reader unfamiliar with the actual situation, would probably not know that the systems "*other than the Niagara*," embrace only the smaller and relatively unimportant systems of the Hydro-Electric Power Commission which serve the less populous sections of Ontario and represent in all less than one-seventh of the total load on the Hydro systems.

The cost of power from these relatively small systems is "compared" by Mr. Murray with the cost in California where over a million horsepower is developed and where the electrical energy "delivered to agricultural industry" states Mr. Murray, alone amounts to about 500,000 horsepower. The comparison Mr. Murray actually makes is foolish, but his attempt thus to beguile his readers is an imposition upon their lack of knowledge of the facts.

From the illustrations already considered it is apparent how inexcusably inaccurate Mr. Murray has been when dealing with data of fact, but when he undertakes to deal with hypothetical factors involving future circumstances, he, as will be seen from the following comments, transgresses sound

procedure in a manner even more indefensible.

By way of illustration, it may be pointed out that in presenting *his* estimates of the cost of Niagara power with the Queenston-Chippawa development operating under various deliveries of power, Mr. Murray commences by making a number of gratuitous assumptions respecting the amounts of water which will be available, the extent to which *he* states existing installations will have to be scrapped, and so on, and then, he proceeds in a most astonishing manner to inflate estimates by millions of dollars. For example, in an important instance he has employed an interest rate of 8.15 per cent, thereby imposing a fictitious annual charge upon the Commission's operations of over \$1,600,000. In another instance he has provided over \$2,000,000 *annually* for the renewal of plant equipment which he proposes to scrap, and which would not be renewed at all. It will be seen from the more detailed consideration of this aspect of Mr. Murray's report how, by inflation and other devices, he has estimated a total annual production cost for power of \$12,310,000 instead of what this total would be if correctly estimated *under his own assumptions*, namely \$7,200,000. In this instance, he has overestimated the cost of power to the Niagara system by about \$11.00 per horsepower or 75 per cent. Evidently Mr. Murray's views of engineering economics demand serious attention and revision.

It will be appreciated that such methods of handling and presenting data as those referred to, simply place Mr. Murray's whole report out of the position where it is entitled to be considered seriously, or even with respect; they show conclusively that the report is not compiled in an "exhaustive" nor in an "impartial" manner and hence its conclusions are not entitled to consideration.

No one reading the Murray report could fail to be impressed with the fact that one of the chief objects which Mr. Murray seeks is to establish his contention that under the auspices of the Hydro-Electric Power Commission's operations the people do not receive advantages in their rates for light and power as great as do the people of the province of Quebec and others in the United States. In other words, Mr. Murray alleges that electrical energy is dearer in Hydro municipalities than it is in other territories to which he refers.

In view of the general unreliable character of statements and comparisons made by Mr. Murray, his comparisons respecting the cost of power could not be expected to command serious attention, but in this connection also, his basic factors are seen to have been greatly distorted according to the erroneous methods above exemplified from other sections of his report, and thus his conclusions respecting the costs of power are also in error.

In the more detailed statement which follows this Foreword, it is explained how Mr. Murray fails to present information which is absolutely necessary in order intelligently to discuss some of the conclusions which he has expressed.

Mr. Murray, for example, has not sufficiently defined his districts nor

the populations which he respectively uses. He has not given summaries of the quantities of power involved, nor shown how, for the respective districts, his quantities are determined. In important instances, he has made comparisons between unlike units with the result that his conclusions, based upon such premises, are necessarily valueless and misleading. Time and again, Mr. Murray dogmatically asserts that comparisons of certain quantities with certain other quantities, give results of such and such percentages, greater or less, as the case may be, but he does not present the basic quantities themselves, with the consequence that no one can tell how he arrives at his percentages. Again, the Commission has been denied the use of certain important data supplied to Mr. Murray respecting privately-owned companies: Mr. Murray's excuse being that the data withheld are "confidential" for his use and could not be disclosed. Because Mr. Murray has dealt with his subject in this manner it has been impossible either with respect to his larger territorial areas or with respect to important cities to which he has referred, to deal specifically with his conclusions involving such communities. However, sufficient data are available for dealing broadly with his comparison between the costs of electrical energy to the citizens of the city of Buffalo and the city of Toronto. From this comparison it will be found that Mr. Murray has blundered in a manner corresponding to that which has so often been shown. According to Mr. Murray the average cost of electrical energy to the citizens of Buffalo is 20 per cent lower than to the citizens of Toronto as supplied by their Hydro system, whereas the data rightly employed show that the reverse is the fact and that the energy costs in Buffalo are on the average higher than the costs of Hydro service in Toronto by over 35 per cent.

The erroneous method which has resulted in false conclusions in the case of the comparison of the costs of electrical energy in the cities of Buffalo and Toronto is the same as that adopted in Mr. Murray's comparisons of the cost of power in various other districts. It follows, therefore, that the results of Mr. Murray's other comparisons must be correspondingly false, and consequently his whole consideration with respect to this subject may be dismissed.

With regard to the charges for electrical energy made by the Hydro-Electric Power Commission, it is sufficient to state that the factors germane to the cost of power are published in the annual reports of the Commission. No other hydro-electric power organization publishes an annual report presenting anything like the amount of classified, detailed information contained in the Commission's reports. All such data are separately audited and approved by auditors independently appointed by the Government of the Province. Had Mr. Murray been just in his employment of even the data which he has utilized, and had he used ordinary discretion in selecting comparable data from other sources, he could never have reached the fallacious conclusions he has published, but on the contrary he would have found that the rates for light and power throughout the Hydro system in Ontario are cheaper than for like service elsewhere in the world. It is actually hydro-electrical energy "at cost."

For lighting alone, the over 300 municipalities now enjoying their "Hydro" service have, during the period of operation, saved through reduction of rates approximately \$60,000,000 over what would have been the cost under rates prevailing before their undertaking was initiated. As Mr. Murray says in his report: "Facts are impersonal things, sometimes they hurt." It is facts like this which appear to hurt Mr. Murray and those who fain would wish his conclusions were sound. But such facts do not hurt the citizens of Ontario who have actually experienced such saving and who know the benefits they have derived from "Hydro" electric power and light.

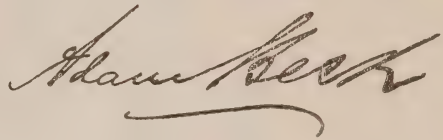
During the fifteen years of its active operation, the Hydro-Electric Power Commission of Ontario has been called upon to bear much unjust criticism. Occasionally this has resulted from well-meaning parties undertaking to discuss phases of the Commission's work respecting which they were really uninformed. On several occasions fretful criticisms have been initiated and published by interested parties in the United States.

Soon after the Commission commenced operations there were propaganda conducted through financial journals in the United States with the object of representing that Ontario's municipal power undertaking would produce a most unfavorable effect on credit—"not only of the Province immediately implicated, but of the Dominion as a whole." In 1913, under the title "An Expensive Experiment," in a bound volume of 281 pages, Mr. R. P. Bolton of New York issued his tirade against the Hydro-Electric Power Commission. Mr. Bolton stated that the purpose of his effort was to "inform the tax-payers of the State of New York of the facts relating to the attempt to fasten at their expense upon our State a speculative experiment, such as that in Ontario." Later the Hydro-Electric Commission was "investigated" by Senator Ferris and his colleagues from Albany, N.Y. These men made an adverse report but its superficial and erroneous character was soon disclosed. Now, the latest of such criticism is that of Mr. W. S. Murray. He, like Mr. Bolton and others, has allowed his zeal to outrun his discretion. He utterly fails to differentiate between certain basic elements differing in quantity, character and situation. Mr. Murray in some respects differs from certain others who have been sent "to investigate" the Commission's work, in that his services were definitely contracted for to prepare this special report—a report which, upon the counts herein made against it, is qualified to take its place alongside of other efforts such as those just referred to as having been made by Senator Ferris and by Mr. Bolton.

When it is appreciated that this great public enterprise—the Hydro-Electric Power Commission—supplies, as it does, power and light to nearly half of the population of the province of Ontario—supplying 242 urban municipalities, 68 townships, and numerous other customers, and involving in all an investment in connection with the generation, transmission, and distribution of electrical energy of over \$200,000,000—it will be understood why

it is necessary to make an authoritative and complete exposure of the character and objects of a report such as that under review.

So long as the 300 odd municipalities—including practically all of the cities, towns and large centres—now co-operating in the province of Ontario for the purpose of supplying the people with electrical service “at cost,” retain their confidence towards each other and towards their Commission, no assaults, no matter what their character may be, can prevail against their great and successful co-operative undertaking.

A handwritten signature in dark ink, reading "Adam Beck". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

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REFUTATION
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contained in the
“Murray Report” *re* Electric Utilities

A LARGE printed report entitled “Government Owned and Controlled Compared with Privately Owned and Regulated Electric Utilities in Canada and the United States,” has been prepared, and published from New York City, under the auspices of the National Electric Light Association,—an organization comprising and representing privately-owned electric utilities chiefly throughout the United States. The Report was prepared by a firm of United States consulting engineers—Messrs. Murray & Flood,—acting under special instructions from the National Electric Light Association. It is signed by Mr. W. S. Murray, from which fact it is commonly referred to as the “Murray Report.”

The ostensible purpose of this report is to present “in a comprehensive and comparable way the advantages of electric service rendered by privately owned and publicly regulated utilities in the United States and Canada contrasted with that supplied by.....the Hydro-Electric Power Commission of Ontario.” Moreover, it is represented to be “based on an impartial and exhaustive study.”

The most casual examination of the report, however, reveals that this is not its *real* purpose; its real purpose evidently is to undermine if not to destroy public confidence in public ownership and in order to do so Mr. Murray attempts to discredit the success of the Hydro-Electric Power Commission of Ontario. The National Electric Light Association always has been and is uncompromisingly antagonistic to public ownership, while of himself Mr. Murray in his report says, “I have never subscribed to government ownership of electric utilities in the United States.” More than six-sevenths of the subject matter contained in the Murray Report consists solely of information relating to the operations of the Hydro-Electric Power Commission, while in the remaining one-seventh, which refers to the operations of privately-owned utilities, Mr. Murray presents practically no

information corresponding to that published by him respecting the Hydro-Electric Power Commission, but deals largely in generalities and assertions. Mr. Murray's report may justly be said to be permeated with comparisons of non-comparable data, with incomplete or misapplied statistics and with serious mis-statement of fact.

**Attacks upon Hydro-Electric Power Commission
of Ontario by Interests Outside the Province**

The Murray report is by no means the first instance of unfair attack being made upon the hydro-electric undertaking of the municipalities of Ontario. From its inception the entire Hydro-Electric power movement has been subjected to bitter and relentless criticism, the instigators of which have spared neither time, money, ingenuity, nor effort in order at every opportunity by unfair criticism to hamper the development of the movement and to discount its success. Practically all of the special publications issued against the work of the Hydro-Electric Power Commission have emanated from sources outside of Canada.

In the early days of the Hydro-Electric Power Commission, extensive agitation against the Commission's programme was carried on through financial journals, in the United States and elsewhere, with the object of showing that the proposed undertaking would produce a disastrous effect upon the credit not only of the Province of Ontario but of the Dominion of Canada. One of the earlier special attempts to destroy confidence in the Ontario co-operative, municipal-ownership plan was in the form of a book entitled "An Expensive Experiment." This book, under the authorship of a New York engineer, was published by certain interests in the state of New York which at the time were busily engaged in an effort to forestall the proposed institution of a plan in New York state modelled upon lines somewhat similar to the then new project in the province of Ontario. In this book, many prophecies were made respecting the alleged ruin which, in various forms, would inevitably be visited upon the unfortunate people of the Province. Comparison of the actual results of the operations of the Hydro-Electric Power Commission with these inspired and prejudiced prophecies, shows a complete discounting of the prophetic abilities of those who inspired the publication of this unjust book.

Later, Senator Ferris and some of his colleagues of the state of New York "investigated" the Commission and made an official report, the superficial character of which was soon discovered even by prominent officials of the State. Many other less important but equally vituperative and unfounded attacks have been made at various times since the Hydro-Electric Power Commission's work was commenced. One of the latest examples of criticism of this nature is the "Murray Report" with which this Statement deals.

The same general class of interests which promoted the compilation and publication of the now almost forgotten Bolton book—"An Expensive Experiment"—corresponds to the interests that have instigated, financed and spread broadcast before the public of the United States and Canada, the "Murray Report." The fallacious nature of efforts like the Bolton report and

the Ferris report was soon discovered, and now one seldom hears them even referred to. Once the real character of the Murray Report is appreciated, it likewise will drop into disrepute, and, doubtless, will be forgotten even by its present supporters.

It is not the custom of the Commission to reply to much of the criticism to which it has been subjected, but the attack in the Murray report is of a character which singles it out for attention. The name of Mr. Murray, on account of his association with work of a public character, is well-known, and for those with whom 'authority' is truth, rather than Truth authority, his representations would probably have wide acceptance, especially by those who possess no means of ascertaining the facts essential for an independent study of the problem. In view, therefore, of the 'authority' sponsoring the Murray report and of the gross misrepresentations which have been made regarding the work of the Hydro-Electric Power Commission, and in view also of the parade of information respecting this Commission published in Mr. Murray's report, it is considered desirable that an authoritative statement be made, exposing the inaccurate and indefensible nature of Mr. Murray's treatment of the subject in hand.

It is unnecessary and it would be unduly tedious to review the Murray report in detail, but sufficient of its representative statements will be dealt with amply to demonstrate its lack of 'impartiality,' of 'exhaustiveness,' and even of reliability with respect to statement of figure and fact. In addition, Mr. Murray's main conclusions, and particularly his allegations respecting the relative cost of power in Ontario as compared with that in various other districts, will adequately be considered and their fallacious nature exposed.

The subject under consideration cannot be properly followed unless there is some clear understanding of the service which the Hydro-Electric Power Commission actually renders as agent and trustee for the municipalities it represents. Discussion, then, of the Murray report may best be opened by a few comments respecting the origin and work of the Commission.

ORIGIN AND DEVELOPMENT OF THE MUNICIPAL HYDRO-ELECTRIC MOVEMENT IN THE PROVINCE OF ONTARIO

In the decade of 1900-1910, the people of the province of Ontario realized that if the Province were to maintain its standing as the chief manufacturing centre of the Dominion of Canada and to expand its manufacturing industries to meet the growing demand for Canadian manufactured products, then a bountiful supply of electrical energy at moderate prices was a basic necessity.

At that time the supply and distribution of electrical energy was largely local in its nature, almost all of the large municipalities being supplied by private companies which largely used steam as the source of power. A few municipalities, favoured geographically by nearness to Niagara Falls and Decew Falls, received hydraulically-generated electrical energy through the agency of private companies. The province of Ontario possesses no coal as a natural resource, practically all of its coal being imported at great outlay

from the United States, and, as a consequence, the eyes of the people were turned towards the large water-power resources of the Province, and particularly towards Niagara Falls, as a means of replacing coal for the generation of power while at the same time greatly reducing the cost of electrical energy for both power and light.

Preliminary studies made in the years 1903 to 1906 brought out the fact that it was economically possible to obtain electrical energy from Niagara Falls and to transmit it from the point of generation over long distances.

**Ontario Decides to Adopt
Co-Operative Municipal Ownership**

Having established the physical practicability and economy of the generation and transmission, it remained to be decided by the people themselves whether the desired and much needed electric service was to be owned and controlled by private corporations or through the medium of a publicly-owned and operated undertaking. The experience of the people of the Province at the hands of the private utility corporations had been of an unsatisfactory nature and such as to predispose the people very strongly against any action which would to any further extent place these public resources in the hands of the private companies. The private companies had shown little disposition to serve any but the large municipalities or those in close proximity to the sources of power, and, even in the municipalities served, the cost of the service and its general character was such as frequently gave rise to expressions of dissatisfaction.

Public spirited citizens who, together with the appointed representatives of the people, first had under consideration the selection of the best means for supplying electrical energy at the lowest possible cost to the citizens of the province of Ontario, were not unfamiliar with the economic features which constituted the foundations upon which many public utilities had been reared in other countries. Some of these features as, for example, the regulation of rates through the agency of special Public Utility Commissions so common in the United States, had been seen in numerous instances to be ineffective. All factors considered, it was concluded best for economic and other reasons to adopt the scheme of co-operative, municipal ownership under the guidance and control of an independent Commission freed, as much as possible, from political interference. Thus the Hydro-Electric Power Commission was constituted to give expression to the principle just mentioned, in preference to private ownership under the regulation of a Public Utility Commission.

**In Their Rates Hydro Customers
Pay for Plants as well as Service**

Throughout the entire development of the Hydro-Electric scheme, the people of the Province have never lost sight of one fundamental, viz., that under the operation of the Power Commission Act, the rates charged to the ultimate consumer for service, must include a sinking fund for the retirement, at maturity, of the bonds sold for the construction of the plant. This means that after the maturity of the bond issues, the people will be owners, outright,

of the properties, and from that time forward the rates will be freed from the portion of the costs due to interest and sinking fund charges on the bonds. In other words, the people of the province of Ontario felt that if they had the choice between service at equal initial rates, through a publicly-owned property or a privately-owned property, it would be cheaper and more advantageous to choose the publicly-owned service, *because even at equal rates they would be buying service plus the plant, whereas under private ownership conditions, for the same money, they would be buying only service.*

Through a period of years, many phases of the subject of "Public Ownership" vs "Private Ownership" were discussed by the people, and sentiment was finally crystallized by the Legislature of the Province passing the Power Commission Act of 1907, which, with amendments and some additions, constitutes the working basis of the entire Hydro undertaking. At this early period, the people of the Province were thoroughly satisfied that the decision adopted and the plan evolved were in their best interests, and as time has gone on they have seen no reason whatsoever to regret the decision originally made.

Growth of the Undertaking of the 'Hydro' Municipalities

The 'Hydro' undertaking of the municipalities of the province of Ontario has developed until it now embraces the larger portion of the more populous section of the Province. The actual growth of the undertaking is well illustrated by the fact that in the year 1910, the Commission supplied 750 horsepower to 10 urban municipalities; in 1915, very nearly 104,000 horsepower was supplied to over 120,000 customers in 112 urban municipalities and 18 townships; and in 1921, more than 305,000 horsepower was supplied to 265,000 customers in 234 urban municipalities and 44 townships, and in addition about 60,000 horsepower was exported to the United States. At the present time a total of about 450,000 horsepower is being distributed and the total investment involved, covering the activities in connection with over three hundred municipal undertakings, is more than \$200,000,000.

The municipalities now own and operate several hydro-electric systems, including generating plants. These systems are:—

Niagara, Severn, Eugenia, Wasdells, Muskoka, St. Lawrence, Ottawa, Rideau, Thunder Bay, Central Ontario, Nipissing.

Of the foregoing, the Central Ontario and Nipissing systems were purchased by the Provincial Government in 1916, their operation being entrusted to the Commission.

In 1917, the Commission acquired for the municipalities practically the whole of the stock of the Ontario Power Company, whose plant at Niagara Falls it now operates. On account of the great increase in load which took place on the Niagara system during the war, the Commission, to meet urgent demands for more power, found it necessary to make a substantial addition to the capacity of the Ontario Power Company's generating plant, and, pending the completion of the Queenston-Chippawa plant, the Commission found it necessary also to purchase large blocks of power from the Electrical Develop-

ment Company, the Canadian Niagara Power Company and the Niagara Falls Power Company.

The widespread distribution of electricity in Ontario is now taken more or less as a matter of course. A map of the Province showing the 3,000 miles of high-voltage transmission lines of the Hydro undertaking very clearly reveals how wonderfully the water-powers of Ontario are being utilized for the benefit of the people as a whole. Hundreds of communities large and small are now supplied with electricity at such low rates that rich and poor alike share in its many advantages.

It is well within the fact to say that nowhere else in the world do so many of the general public make such extensive use of electricity in their homes as is done in Ontario. Moreover, the magnitude and rate of growth of the commercial and power loads on the Commission's systems indicate very clearly that the decision of the municipalities to provide hydro-electrical energy "at cost" has rendered its use popular for a great variety of purposes. The detailed financial statement presented in this publication exhibits the surpluses and other financial data appertaining to the operations of the Commission with respect to the Niagara system.

PROMINENT FEATURES OF THE MUNICIPALLY-OWNED HYDRO-ELECTRIC POWER UNDERTAKING IN ONTARIO

In its essence, the hydro-electric power undertaking of Ontario is an organization of a large number of partner municipalities, co-ordinated for action and operation through the medium of the Hydro-Electric Power Commission of Ontario which acts as a trustee for the municipalities. The Commission in its function as trustee, generates or purchases electrical energy and transmits the energy to the various municipalities of the Province which can economically be reached by its transmission network. In its function as trustee, the Commission operates the generating stations and transmission systems, and, each year, allocates the entire cost of operation of each system among the respective partner municipalities, so that each one contributes its own proper proportionate share towards the total cost of operation. Each municipality owns its local distribution system and distributes the power to the individual customers in the municipality. These individual customers, in turn, are charged rates which will meet the cost of power furnished to the Municipality by the Commission, together with the cost of operation and management of the municipal distribution system.

The Financial Structure of the Municipally- Owned Electric Systems of the Province of Ontario

In order to inform people outside of the Province, it is desirable here to record in concise form, the framework of the financial structure of the Hydro-Electric systems, as follows:

1. The generation and transmission of power on a wholesale scale is dealt with by a Commission which, although appointed by the Government of

the Province, acts independently in the capacity of trustee and agent for the partnership of municipalities.

2. The local distribution of electrical energy within the borders of a municipality is, in general, under the administration of a public utilities commission appointed under the provisions of the Public Utilities Act.

3. Capital required for the plant for the generation and transmission of power is provided by the Government upon receipt of formal requisition from the Commission. Contracts are entered into between the Commission and the municipalities under the terms of which the municipalities undertake to repay in thirty years the monies thus loaned by the Government.

4. The local distribution system is financed by the issue of municipal debentures. Provision is made in the rates charged to the ultimate consumers, for revenue with which to retire these bonds also, usually in twenty years.

5. The "trustee" Commission supplies power at wholesale rates to the municipalities, charging each municipality the actual cost. To do this, an interim charge is made monthly based upon the estimated cost and, at the end of each year, credit or debit adjustment is made of the amount charged, in order to make up the actual total cost,—no more and no less.

The "cost of power" includes all the usual costs of operation and maintenance of the generating, transforming and transmission plant and equipment, and, in addition, the annual interest charges on the monies borrowed for the initial cost of installation, also provision for renewal (depreciation) and sinking fund reserves, as well as a special reserve fund for contingencies.

The sinking funds are, of course, for the purpose of repaying, at the end of a stated period—usually twenty or thirty years—the capital borrowed. The renewal reserve fund is used for the replacement of plant which, either through wear, old age, or the invention of better engineering devices, has become unsuited to perform its duties. As relatively little replacement of this nature is needed during the first years of operation of a plant, this renewal money is not immediately used, but is mostly held in reserve for future requirements and in the meantime it draws interest. Contingency reserve makes provision for extraordinary or unforeseen demands arising from accidents, storms, or similar causes. Thus, not only do the municipalities pay as part of the cost of power, sums sufficient to assure for themselves a perpetual, modern and efficient service but, in addition, their generating and transmitting plant, at the time of the maturity of the bonds, will be free of debt, and their electrical service costs will thenceforward be relieved of the interest and sinking fund charges which at present constitute a very considerable proportion of the wholesale cost of power.

6. Each municipality sells electrical energy to its own local consumers at rates and under conditions approved by the Commission, which, in this respect, functions in a manner similar to the regulatory Commissions in the United States. The rates charged to its own consumers by a municipality are made

sufficient to take care both of the cost of distribution within the municipality and of the estimated cost of power to be paid to the Commission by the municipality. The cost of distribution is ascertained in a manner identical with that used by the Commission in arriving at its wholesale costs.

Inasmuch as the annual sinking fund and interest charges constitute at present upwards of forty per cent of the total cost of power, it is clear that as the successive issues of the municipal and provincial bonds are retired, and interest and sinking fund charges thereon become correspondingly less, consumers will obtain their power still more cheaply than at present.

In the case of individual consumers it is, of course, not practicable to render at the end of the financial year a supplementary bill or to give a credit note as the case may be, in order to adjust the charges made during the year to equal the exact cost; therefore, the adjustment or balancing is effected by raising or lowering the rates for the succeeding year. The progressive lowering of the rates which has thus actually been possible in most of the municipalities served by the Commission has resulted in such a rapid increase in the sales of power that the lowered rates have been unable to keep pace with the steadily reducing costs of the service, with the final result that in the majority of cases considerable surpluses have annually resulted. Such surpluses are applied either to the reduction of debt or to the provision of additional equipment.

7. Under the Power Commission Act, the Commission is required to determine, annually, the actual cost of service supplied to the municipal corporations by the local commissions for such strictly municipal purposes as street lighting and operating electric-motor-driven pumps in waterworks, and if any profit has accrued through the charging of the rate used throughout the year, this surplus is handed back to the municipal treasurer.

The soundness of the Hydro undertaking is well evidenced by the large "Balance Sheet" presented with this statement. This sheet sets forth in detail the financial relationship existing between the Commission and the respective municipalities in the Commission's oldest and largest system—the Niagara system.

True Character of the "Murray Report" Disclosed

Having thus reviewed some of the prominent and unique features of the work of the Hydro-Electric Power Commission of Ontario, attention may be directed specifically to the character of the Murray Report.

Anyone familiar with the representations made by Mr. Murray in his report respecting the work of the Hydro-Electric Power Commission will recognize how very different many of his statements are from the foregoing authentic description of the operations of the Commission. But in addition to such vagaries, Mr. Murray in his report makes grossly incorrect and misleading statements; he garbles documentary and other data and then employs them as premises from which to derive conclusions; he makes pronouncements based on comparisons so inadequate that they are puerile; he makes charges which he fails to substantiate; he ignores important factors, even disregarding most pertinent engineering data and, in general, Mr. Murray adopts methods which are manifestly reprehensible and unprofessional. Obviously, conclusions reached through the employment of such means are necessarily worthless. That the charges here made are fully justified will be clear from the illustrations of Mr. Murray's methods presented in the following discussion.

It would be impracticable to review all the material which Mr. Murray has copied into his volume. The Murray Report is heavily 'padded' with statistics, copies of legislation and other information found chiefly in the annual and other published reports of the Hydro-Electric Power Commission of Ontario. This material, it is true, makes an imposing 'exhibit' but, in view of the fact that so much of it has been ignored by Mr. Murray in drawing his conclusions and that its relevance to the subjects under discussion is often quite remote, the material appears to have been inserted largely in order to create an impression of 'exhaustiveness.' That Mr. Murray's expressions of "opinion" are unworthy of consideration will be evident after the general character of his report becomes appreciated.

Mr. Murray Purposely Confuses "Government Ownership" with "Municipal Ownership"

Throughout his report Mr. Murray persistently uses the term "Government Ownership" as applying to the undertaking of the Hydro-Electric Power Commission of the province of Ontario.

With respect to his peculiar and prominent use of the term "Government Ownership" Mr. Murray in his report states:

"The term 'Government Ownership' needs explanation. In Ontario this term, used throughout the report, is associated with both the Central and Local Government."

Here, Mr. Murray arbitrarily declares that *in Ontario* and throughout his Report the term "Government Ownership" is associated with local,—or municipal—ownership just as with central government ownership. Mr. Murray's statement regarding the accepted meaning in Ontario of the term "government ownership" is not correct. In Ontario, this term signifies ownership by the provincial or federal government—that is, by the central authority—and not ownership by the municipality.

Mr. Murray follows *his* definition of "Government Ownership"—as above quoted—by explaining that

"In the States 'Municipal Ownership' has reference to a City only."

Now, in Ontario "Municipal Ownership" carries just the same significance as in the States, except that in Ontario it comprises not, as Mr. Murray explains, the "City only," but also towns, villages and other smaller communities. Consequently, it is clear that neither in the United States nor in Ontario has Mr. Murray justification for attaching to municipal ownership the name of "Government Ownership" nor for the special significance which he attaches to the latter term. Such a significance is especially unwarranted when the term is employed in the manner in which Mr. Murray uses it "throughout" his report.

It is widely recognized that many efforts of "Government Ownership" in the United States have fallen far short of the goals sought, and thus in the United States the term "Government Ownership" has an especial obloquy attached to it. "Government Ownership" not infrequently carries as a concomitant, political domination in the appointment of employees, in the purchase of supplies and equipment and in various other more or less hidden ramifications, which inevitably tends towards inefficiency and mismanagement. These destructive agencies are completely lacking in the functioning of the Hydro-Electric Power systems in the province of Ontario. Moreover, the people are thoroughly well aware of this fact and are firmly resolved that matters shall so continue. Even the bitterest enemies, whether domestic or foreign, of the Ontario public ownership plan, are forced to concede the advantages of the wise provisions which guard against political interference.

It was vital to Mr. Murray's presentation that, by some means, he should identify the undertaking of the Hydro-Electric Power Commission with government ownership, in order that the stigma of government ownership as commonly understood should be transferred to the unique, co-operative, municipal-ownership undertaking of the Commission and thus aid in casting discredit upon the achievements of the people of the province of Ontario in obtaining their hydro-electrical energy *at cost*. Mr. Murray's sophistry as displayed in the quotation under discussion, can deceive no one, once attention is directed to the shallowness of his subterfuge.

It may just be added that, after all, the real issue underlying the subject under discussion is not the question of "ownership," *per se*, but the question of what kind of control and administration is exercised by the governing or

administering body. Had Mr. Murray emphasized this feature of administration, he would have displayed a grasp of the subject which is not in any sense disclosed by his erroneous and unfair use of the term "Government Ownership."

Mr. Murray Garbles Documentary Data

Mr. Murray in his report makes various statements regarding *his* conception of the powers legally vested in the Commission. Inasmuch as Mr. Murray had all the legislation before him, any direct misrepresentation of such documentary data must cast serious reflection upon his methods.

Mr. Murray states that:

".....legislation has been constantly passed so that the Commission is entirely free from any character of inhibition; barriers, legal or otherwise, are levelled to give free swing to the conscience and action on the part of the Commission.

"A power of procedure has thus been granted to the Commission, unlimited."

This, then, is the conclusion Mr. Murray draws from his study of the operations of the Hydro-Electric Power Commission and of its special powers as conferred by the provincial Legislature. The extent of the liberty Mr. Murray is ready to accord himself in altering and misconstruing documentary records is revealed by the following examples:

On page 9 of his Report, Mr. Murray states:*

"One of the Power Acts reads:

"The Commission shall have the exclusive jurisdiction as to all matters in respect of *that* authority *as* by Act conferred upon it and nothing done by the Commission within its jurisdiction shall be open to question or review in any action or proceeding or by any Court"—

The clause most nearly resembling Mr. Murray's alleged quotation from the Act occurs in "The Power Commission Amendment Act, 1911," and is as follows:

"The Commission shall have exclusive jurisdiction as to all matters in respect of *which* authority *is*, by *this* Act, conferred upon it and nothing done by the Commission within its jurisdiction shall be open to question or review in any action or proceeding or by any Court."

As Mr. Murray knows, all the Power Commission Acts passed prior to 1914 were revised and consolidated in Chapter 39 of the "Revised Statutes of Ontario, 1914," and the 1911 Amending Act was then superseded by the consolidation and the section quoted above stands since 1914, as follows:

"The Commission shall have exclusive jurisdiction as to all matters in respect of *which* authority *is*, by the next preceding three sections, conferred upon it, and nothing done by the Commission within its jurisdiction shall be open to question or review in any action or proceeding or by any court." (R.S.O. 1914, c. 39, s. 34).

* Here, and in some other instances, certain words in quotations have been italicized for purpose of emphasis

It will be observed that Mr. Murray's alleged quotation from the Act has departed from both the original and the present form of this clause and in such manner as essentially to alter its meaning.

Comparing the phrase, as given by Mr. Murray

"in respect of *that* authority *as* by Act conferred upon it,"

with the phrase actually occurring in the 1911 Act

"in respect of *which* authority *is*, by *this* Act, conferred upon it"—

it will be seen that the word *this* has been omitted by Mr. Murray, and two other changes have been made. The alleged quotation, as given by Mr. Murray, would make it appear that the clause relates to the operations of the Commission as a whole instead of referring only to the relatively unimportant and special features defined in *this* Act—namely, the 1911 Amending Act—and as defined also by the qualifying phrase "by the next preceding three sections"—which appears in Chapter 39 of the Revised Statutes. As a matter of fact, the 1911 Act and "the next preceding three sections" of the 1914 consolidation, refer solely to a comparatively unimportant power of the Commission which permits it to approve of certain matters relating to the joint construction of lines on highways and in which connection the Commission acts in the capacity of a regulatory commission. It is, therefore, clear both from the original Act and from its present form, that the exclusive jurisdiction of the Commission was very strictly *limited*, and not, as Mr. Murray so incorrectly states, "*unlimited*."

Mr. Murray Misrepresents Hydro Legislation

Mr. Murray in his Report makes the following statement:

"A remarkable situation created by one of the laws passed under the Power Commission Acts requires that a municipality assume the debt to provide the facilities necessary to the supply of power to an individual or corporation in that municipality, if request for power is made, and the only recourse to recovery if the bills for power are not paid is the levy of tax against the party contracting."

The "situation" would indeed be "remarkable," were Mr. Murray correct in his statements, but evidently he has failed to understand the principle and purpose of the Act to which he refers.

Mr. Murray's statement is contrary to the fact in two important particulars. In the first place, the portion of the Act referred to, which is for the accommodation of persons in those municipalities not served with Hydro power, *permits* but does not in any way *require* the municipality to contract or in any manner to assume liability, for the supply of such power. In the second place, the privilege of recourse for the recovery of unpaid bills for power through the levy of tax is not, as Mr. Murray states, the "*only recourse*," but is granted only as an additional safeguard and convenience, and does not in any way prejudice the municipality's right of recovery through the ordinary process of law. As a matter of fact, this provision regard-

ing the collection of bills through the taxes is primarily a provision of the Public Utilities Act of the Province and applies to all publicly owned and operated services. It may be added, that the parties applying for power, must, along with their application, provide evidence of their possessing sufficient property to constitute adequate security to the municipality in case of default in carrying out the terms of their contracts. Appreciation of the facts just recited will show how very incorrectly Mr. Murray has represented the intent and provisions of the legislation to which he refers.

**Mr. Murray Grossly Misstates
the Fact Respecting Fiats**

Mr. Murray on page 10 of his report refers pointedly to a "suit brought and won by the Toronto Power Company against the Ontario Power Company owned by the Commission." Commenting upon this, Mr. Murray says that,

"Had the Ontario Power Company lost its corporate identity, in accordance with the Power Commission Act, no suit could have been brought, since the Commission cannot be sued without fiat from the Attorney-General, and to date no fiat has ever been granted."

The statements that "no suit could have been brought," and "to date no fiat has ever been granted," are utterly without foundation and contrary to fact. Since 1912, more than twenty-five fiats have been granted by the Attorney-General to permit legal action to be brought against the Commission. With a single exception, every party that has desired to bring suit against the Commission has been granted a fiat by the Attorney-General, and even in this one exceptional case the reason for withholding the fiat was not to shield the Commission, but because the applicants coupled the Attorney-General with the Commission in the hope of involving the Province in a manner which would clearly have been contrary to the public interest.

Mr. Murray's bald mis-statement of such an important and fundamental fact regarding the Commission is inexcusable and casts grave doubt upon the trustworthiness of his statements and especially upon the claim made of dealing with matters under discussion in an "exhaustive" manner.

General Misrepresentation Respecting Fair Dealing

With reference to general misrepresentations by Mr. Murray of the Commission's position with respect to various matters, it may be instanced that Mr. Murray states:

"I cannot find justice in a jurisdiction which permits the Commission to recover damages by process of law when persons contracting with it are not allowed the same relief."

It has just been shown that Mr. Murray's contention that the Commission occupies a specially favoured position with respect to fiats is absolutely incorrect, and this phrase is equally applicable to his general charge as summarized in the quotation just given. It should fully be appreciated that the object of requiring a fiat is not to work any injustice to those with whom the Commission has relationship but simply to avoid litigation of an unnecessary

and vexatious nature. The rights of all parties concerned are comprehensively taken care of under provisions of the Arbitration Act. For example, the Commission's contracts with both private and corporate interests provide that matter of dispute shall be dealt with under the Arbitration Act of the province of Ontario, and under such procedure there can be no possible advantage to any of the parties. The following citation from one of the Commission's contracts will illustrate the kind of provision made to ensure fair treatment for all:

"THAT in case of any dispute arising between the parties relative to the fulfilment of any of the terms, provisos or conditions of this agreement, or as to the method or accuracy of the measurement of power, or any other question which may arise under this agreement, the same shall be promptly referred to arbitration under the Arbitration Act, and the finding of said Arbitrator or Arbitrators shall be final and binding upon both parties hereto."

Another instance from his report will serve to exemplify the kinds of facts Mr. Murray fails to quote on behalf of the Commission, but which, if quoted, would absolutely nullify such general statements as that expressed by him as follows:

"There are a very considerable number of persons and corporate interests in Ontario who possess the feeling that the Commission has dealt with them unfairly, and, notwithstanding the inherent fairness of mind possessed by Sir Adam Beck, it is plain that corporate advantage has been taken under the powers granted the Commission."

In the first place, it is very unlikely that an outsider like Mr. Murray would be circumstanced to pass an unprejudiced judgment upon the subject to which he refers, if for no other reason than that he has not brought such cases as he may have in mind to the attention of the Commission in order that he might be in possession of knowledge from both sides of the case. The Commission believes that where all the facts which have governed in decisions are considered, it will be evident not only that the Commission has desired to deal fairly, but also that in all cases a reasonable and just decision has actually been determined.

In replying to such a general charge as Mr. Murray has made in the quotation above given, and by way of illustrating the fairness of its dealings with the public, the Commission would say that: although under the Power Commission Act the Commission possesses the right to expropriate private plants, nevertheless,—with a single exception involving a case which at present is under consideration—the Commission since commencing its operations has never exercised its powers of expropriation, although it has purchased no less than twenty water-powers, thirty hydraulic generating plants and over sixty electric distribution systems. In every such transaction the Commission has negotiated fair terms, satisfactory to the interests immediately involved, to the municipality or municipalities concerned, and to the public at large. This fact is sufficient proof of honorable and fair dealing on the part of the Commission, and is also ample refutation of Mr. Murray's charge. Such statements as he has here made are certainly not "impartial," but are hasty and unwarranted.

Mr. Murray Ignores Half the Cost of Buffalo Street Lighting

Under the caption of "The Cost of Street Lighting Compared in Toronto, Buffalo, and Montreal," Mr. Murray purports to have under comparison the *per capita* cost of street lighting to the city of Buffalo with the *per capita* cost of street lighting to the city of Toronto. Mr. Murray, either wittingly or otherwise, makes direct misrepresentation regarding the cost of street lighting in the city of Buffalo. Apparently, he has totally ignored the fact that in Buffalo, in 1920, out of a total of 15,000 street lights, over 8,800 were not electric, but were gas or gasoline lights.

Mr. Murray, with regard to street lighting in Buffalo, states,

"In Buffalo the price has changed very slightly, ranging from 53 cents per capita in 1913 to 60 cents per capita in 1920."

As a matter of fact, in 1920, the cost of street lighting in Buffalo was not, as Mr. Murray represents it to be, 60 cents, but \$1.15 per capita. The following table for 1920 gives the actual street lighting data for Buffalo and for Toronto.

TABLE I
COST OF STREET LIGHTING IN BUFFALO AND TORONTO IN 1920

City.....	Buffalo*				Toronto
Population.....	505,875				499,278†
Type of Lamp.....	Electric	Gas	Gasoline	All Lamps	All Lamps Electric
Number of Lamps.....	6161	8796	62	15,019	43,310
Lamps per 1000 population.....	12.2	17.4	0.1	29.7	86.8
Cost of Street Lighting.....	\$286,196	\$295,447	\$3,136	\$584,779	\$335,370
Cost per Lamp per year (Av.)	\$46.50	\$33.60	\$50.52	\$38.90	\$7.74
Cost per capita.....	\$0.56	\$0.58	\$0.01	\$1.15	\$0.67

*Ballard—*Report on Street Lighting Costs in the Larger Cities of the United States of America, 1920*, Cleveland, 1920.

†This population, which Mr. Murray has used, though reported with the municipal statistics for 1920, is the 1919 population. The 1920 population indicates a cost for Toronto of only 65 cents per capita.

It is interesting to note that Toronto, with little more than half the total expenditure for street lighting, maintains nearly three times the number of street lights that Buffalo does.

Since Mr. Murray has made no reference to the fact that nearly \$300,000 per year is paid by the city of Buffalo for lighting its streets by gas and gasoline, it is possible that he was ignorant of the fact that Buffalo, unlike Toronto, is not wholly lighted by electricity. If Mr. Murray knew this fact and deliberately neglected to include the cost of gas street lighting in Buffalo in his "cost of street lighting," his statement—"In Buffalo the price has changed very slightly, ranging from 53 cents per capita in 1913 to 60 cents per capita in 1920,"—has deliberately misrepresented the fact, and in so doing cannot possibly be excused. A blunder or misrepresentation involving but a small proportion of the total might be condoned, but when Mr. Murray, with the purpose of showing that street lighting costs in Toronto are higher than street lighting

costs in Buffalo, represents the cost of street lighting in Buffalo to have been but 60 cents per capita, whereas, actually, it was \$1.15 per capita, he has outstepped the bounds of excusable error.

**An Example of Mr. Murray's Methods
His Comparison of Ontario and California**

As a typical example of the method adopted by Mr. Murray to mislead his readers, attention may be directed to the way in which he presents his comparison of the average costs of power to the people of California and Ontario. Mr. Murray emphasizes in some detail that there are differences to be considered—in order to be, as he expresses it, “only fair to California in making a comparison of its power costs to those of Ontario,” and directs his readers’ attention to the disadvantages of water power developments in California and the advantages of *Niagara Falls and the Niagara District* in comparison therewith.

He states for example:

“it is important to remember....that *Niagara Falls*, combining its continuous flow of water with its high head, should make the production of continuous power the cheapest for any part on the American Continent *This should be kept in mind especially when the comparison is drawn for the California situation*, where the hydro electric power developments are small in capacity and subject to variation in stream flow, thus requiring that their systems be supplemented with steam electric plants.”

and again, on the second page following under the heading “California Compared to Ontario,” he states:

“In California, electricity is produced and transmitted under far more disadvantageous conditions than those obtaining *in the Niagara district* of Ontario. In California, 41% of all the generating capacity is represented by steam-electric plants. Obviously, therefore, such a physical situation does not lend itself to the production of cheap power to the extent possible by the electric utilities receiving power *from Niagara Falls*.”

Having thus described the characteristics which he wishes his readers to bear in mind, “when the comparison is drawn for the California situation,” and having, by his specific references to the advantageous position enjoyed by the electric utilities receiving power from Niagara Falls, created an “atmosphere” in which the reader is ready to admit, for the sake of argument, that the water powers of California must of necessity be smaller and less advantageously situated than the great power developments at Niagara, Mr. Murray proceeds to his comparison, and states “the average cost of power to the people of California is less by 4% than that to the people served by the systems *other than the Niagara* in Ontario.”

Now the sum of the loads on all the systems “*other than the Niagara*” system is only one-seventh of the total loads of the Hydro including the Niagara system. In other words, Mr. Murray calls attention to the specially advantageous situation of *the Niagara system*, which uses six-sevenths of the total power of the Hydro systems, and then ingeniously switches to a comparison

with the Hydro systems *other than the Niagara* which altogether use only one-seventh of the total power.

Thus it will be seen that the Niagara system to which Mr. Murray directs his readers' special attention has nothing at all to do with the comparison he actually makes. The fact that the power developments serving the *other* systems of the Commission have none of the advantages of Niagara Falls "combining its continuous flow of water with its high head" matters not to Mr. Murray. The fact that in the actual "comparison" he makes he leaves out the Niagara system which supplies eighty-five per cent of the Commission's power, is to him equally unimportant.

Not only has Mr. Murray, in making his comparison, omitted the Niagara system, but he has evidently omitted the second largest Hydro system—the Central Ontario system—for in his general discussion of the question of the "Cost of Power to the People," he states, "For the comparisons between government electric utilities in Ontario and those for privately-operated companies, the Central Ontario system of the Hydro-Electric Power Commission is *omitted*"

It may here be pointed out that it is usually difficult and frequently impossible to ascertain from Mr. Murray's report just what he is actually comparing. For instance, in the case of California, the general impression conveyed is that comparisons are being made with the whole of the State, nevertheless, elsewhere, Mr. Murray refers to "that section of California analysed" but where situated, or what constitutes the confines of the "section" analysed, Mr. Murray fails to state.

Mr. Murray's actual comparison plainly ignores the Commission's two largest systems and embraces only the smaller systems. The cost of power from these relatively small projects is "compared" with the cost in California where over a million horsepower is developed and where the electrical energy "delivered to agricultural industry" alone amounts, states Mr. Murray, to about 500,000 horsepower. Yet Mr. Murray has the effrontery to set forth his "impartial and exhaustive" study in this connection under the caption "California compared to Ontario," when, evidently, his comparison is made not on this broad basis, nor between California and the Hydro-Electric Commission systems as a whole, nor even between California and the only Hydro system which, in magnitude, is at all comparable with California, namely, the Niagara System, but between an undefined "section of California analysed" and the smaller and relatively unimportant systems of the Hydro-Electric Power Commission serving the less populous sections of Ontario and representing less than one-seventh of the total load on the Hydro system.

When it is considered that in spite of his devious methods, Mr. Murray has been able to claim for the cost of power in California an advantage of only four per cent over systems *other than the Niagara*, his comparison becomes foolish in the extreme, and his expedients in this connection constitute in themselves a striking testimony to the cheapness of power under the operation of the Hydro. With respect to Mr. Murray's method the reader himself may be the judge. There is nothing "fair," there is nothing "impartial," in such trickery.

**Hydro Rates and their Influence
On the Concentration of Industries**

Mr. Murray, with respect to the method employed for the determination of rates, states that,

“The rate-making method employed by the Hydro-Electric Power Commission of Ontario favors those municipalities located near the sources of power and in close proximity to the main transmission lines. The lower rates for power to such municipalities cannot avoid the eventual concentration of industry in a few of these favorably located municipalities, and this rate system must, by its very structure, tend to retard industrial development over the Province as a whole.”

This statement by Mr. Murray does not accord with the facts. Respecting the concentration of industry, the Hydro-Electric Power Commission has been supplying electrical power for over ten years and there is no evidence that, as a result of “Hydro” operations, concentration has taken place, nor does Mr. Murray attempt to demonstrate that it has. He charges that in the future there will be “eventual concentration.” As opposed to Mr. Murray’s statement above quoted, it may be stated that the distribution of electrical energy as accomplished by the Hydro has made electrical power available in the smaller municipalities and over an extensive area at rates far below those at which the service could be produced or delivered locally by private companies or by the individual municipalities themselves. This, in itself, tends towards decentralization of industries, and has resulted in retaining in, and attracting to, both the smaller and the more distant places, those industries which—apart from the question of power—would naturally be domiciled or attracted there.

Of course, there are certain works, such as those of the pulp and chemical industries, which must have large blocks of power at low rates in order to operate successfully; these usually are compelled to gravitate to the sources of power. It is especially noteworthy that concentration in the vicinity of water powers of those industries which require large amounts of power is a striking feature of large developments under private ownership. Mr. Murray conveniently overlooks this fact, although he naïvely admits elsewhere that “the transmission distances to reach their [Hydro] customers are generally greater than those of the private companies, compared thereto.”

In the more remote areas of the Niagara System—from forty miles to some two hundred and fifty miles distant from Niagara—Hydro power is distributed in the larger centres alone to the extent of over 130,000 horsepower, and of this amount more than twenty-five per cent is supplied to municipalities situated more than one hundred miles distant from Niagara Falls. This certainly is not “concentration of industry” at the source of power.

Again, and by way of example, in the town of Walkerville, situated 240 miles from Niagara, the cost of power is over twice that in the city of Niagara Falls, Ontario, nevertheless, in the last six years the town of Walkerville secured over four times as many new industries as the city of Niagara Falls.

An examination of all the facts will conclusively demonstrate that, far from tending—as Mr. Murray unjustly charges—to “retard industrial development over the province as a whole,” no other individual factor has contributed more to the general industrial progress of Ontario “as a whole,” than have the operations of the Hydro-Electric Power Commission acting on behalf of the associated municipalities of the Province.

**No Such Discrimination in Rates
As Mr. Murray Alleges**

Mr. Murray in referring to the subject of Hydro rates states in his report that:

“It is very plain that the method pursued.....must automatically lead to discrimination in rates.”

and under the heading, “Un-uniform Power Costs in Ontario,” he states:

“An example of this is the price paid for power in 1919 in the cities of Toronto and Bolton, where the figure was \$16.70 per horsepower year for Toronto, and \$53.80 per horsepower year for Bolton, notwithstanding the small distance apart.

“The rate structure of the Hydro-Electric Power Commission..... must necessarily bring about such a result. It is my opinion that a rate structure so planned is fundamentally wrong.”

Owing to the many differences in underlying circumstances such as differences in situations, in amounts of power required and other factors, it is conceded that it is very improbable that any two municipalities can be supplied with hydro-electric power from a distant source at the same actual cost per horsepower, and without hesitation it is admitted that the rate structure of the Hydro-Electric Commission does inevitably bring about un-uniform power rates to the municipalities, for the very simple and obvious reason that each municipality is supplied at the actual cost of the service to that particular municipality and the costs per horsepower to the various municipalities necessarily differ.

Such fundamental differences are recognized in practically all spheres of business activity. Wholesale prices differ from retail prices, and, moreover, no one would expect to purchase goods delivered 200 miles distant from the factory at the same price as he would pay f.o.b. at the factory, nor would he expect to obtain goods in small quantities for the same price as in carload lots. Similarly, in the business of electrical supply, the price per horsepower must vary, not only according to the distance from the generating source, but also according to the quantity transmitted; other factors also have to be taken into consideration and consequently the Commission with respect to its rates differentiates according to the various governing basic conditions. It should be appreciated that, due to diversity and other factors, differences in rates to consumers are usually smaller than the differences in the wholesale rates to the same municipalities. Under the Commission's plan, it is possible to supply electricity at attractive rates to places so small or so remote from the

source of power that no company would consider delivering power under such conditions.

If Mr. Murray prefers that the larger municipalities, and those located nearer to the source of power, should help to pay for the power required by the smaller and the more remote municipalities, he must do so from an altruistic standpoint. This may be Mr. Murray's "opinion" but it does not in any way alter the *fact* that the plan of the Commission's rate structure—charging each municipality in proportion to what it costs to render the service—is not "fundamentally wrong" but is *fundamentally right*.

Mr. Murray cites as an instance of what he terms "discrimination" on the part of the Commission, the "cities of Toronto and Bolton," situated at approximately equal geographic—although not at equal transmission line—distances from Niagara Falls. The respective populations of these communities are about 500,000, and 675. Mr. Murray states that in 1919, the cost of power supplied to the city of Toronto was \$16.70 per horsepower per year, whereas the cost of power supplied to the *village* of Bolton was \$53.80 per horsepower per year. Does Mr. Murray wish it inferred that power can or should be supplied to both these municipalities at the same rate, and that this would be the case were the supply furnished by a private company? In reality, the amount of power used by the village of Bolton, which is situated approximately 30 miles from the city of Toronto, was in 1919, less than 90 horsepower, and no private company would even have constructed lines to supply any electrical service to this village. Under private ownership, a village situated as is Bolton, would be forced to obtain its electric power locally from a small, inefficient steam or producer-gas plant, or forego the conveniences of electricity.

To the city of Toronto which purchases some 60,000 horsepower the cost per horsepower is naturally much less than that for the village of Bolton which, even at the present date, takes but 120 horsepower, because the Commission can provide the equipment essential for the delivery of 60,000 horsepower to the city of Toronto at a lower rate per horsepower than it can provide the equipment for the delivery of but 120 horsepower to a village even though situated, as Mr. Murray points out, at about the same distance from the source of power.

The Hydro municipalities all recognize the inherent fairness of this plan of "power at cost" and are satisfied that the policy of the Commission respecting rates for electrical service works out to the best advantage of all the municipalities concerned.

Although the Commission does not launch out into any such quixotic scheme as that advocated by Mr. Murray, nevertheless, there is no doubt that the plan adopted has resulted in the greatest good to the greatest number, and that far more people are now enjoying the benefits of Hydro service than could have been the case if any uniform rate plan had been adopted.

**Co-operative Municipal Ownership
Has Not Throttled Initiative in Ontario**

In his report Mr. Murray states,

“Government Ownership eliminates all incentive for gain and throttles initiative. This is evidenced by the far greater growth of privately-owned utilities.”

In the conduct of the Ontario co-operative municipal-ownership system, there is substituted for the “incentive for gain,” the desire to reduce, as low as possible, the rates at which electrical energy is supplied to the ultimate consumers who are the real owners of the systems. Although there is no “incentive for gain” in the Commission’s undertaking, nevertheless, the desire on the part of the co-operating municipalities for reasonable rates is sufficiently strong, and exerts sufficient pressure upon those charged with the operation of the systems, to effectually prevent any “throttling of initiative.” The best evidence that initiative has not been throttled, lies in the numerous and consistent reductions which have been made in rates, as clearly set out in the Commission’s annual reports. The people of the Province are well able to judge respecting the rate of growth of the Hydro-Electric undertaking. As yet no dissatisfaction has been expressed with the rate of expansion of the systems. Further on, figures are given which bear witness to a rate of growth such that it is very doubtful whether any *bona fide* demonstration can be given that it is surpassed, if indeed paralleled, by any other system in the world.

**Mr. Murray Jumps to Unjustifiable
Conclusions Respecting Municipal Taxation**

Mr. Murray has dealt at length with the subject of municipal taxation in the endeavour to attribute to the operations of the Hydro-Electric Power Commission the fact that certain municipalities receiving Hydro service have somewhat heavier taxes than have other municipalities which do not take Hydro service. As a matter of fact, it is obvious that Hydro service must *reduce* the taxes because the Hydro Commission supplies municipal electric services such as street lighting and waterworks pumping “at cost.”

In his treatment of this subject, Mr. Murray has compared groups of municipalities which differ in average population by over one hundred per cent; he has compared groups of municipalities whose inhabitants differ not only in race, customs, and education, but also in wealth and in individual productive capacity to the extent of at least fifty per cent. He has practically ignored many of the basic factors which determine the tax rate, among which may be mentioned the standards of living of the citizens; the mileage of streets maintained; the character and extent of service received in return for taxes; the net debt and the rate of interest thereon, and the efficiency of municipal management.

Mr. Murray has simply assumed that it is Hydro service which causes higher taxes and he endeavours to convey this impression to the reader. The reader who appreciates the superficial methods adopted by Mr. Murray and the total lack of any really comprehensive treatment of the subject or presentation of supporting proof will understand the absurdity of Mr. Murray's assumption.

**Intangibles Included In Hydro Rates are Due
To Early Alienation of Public Resources to Private Companies**

In his report, Mr. Murray draws attention to "intangibles" and states that:

"Money has been paid for such intangibles and therefore power at cost to the people must include them. Here, therefore, seems to be the place to say that where the Hydro-Electric Power Commission offers such purchased power, as power 'at cost,' this does not mean power produced by a value of the works alone, but includes a money loss in interest on the sum paid for the intangibles."

It is perfectly true, as Mr. Murray states, that the users of electrical energy must now pay in their rates for light and power an extra cost which has been entailed through the necessity of paying for "intangibles;" but Mr. Murray has failed to draw attention to the fact that this extra cost was incurred, not on account of public ownership, but as an inevitable result of having originally handed over a public heritage for the enrichment of individuals or private corporations. If the principle of ownership of power developments by the people had been applied at an earlier date, this cost for "intangibles" would have been entirely avoided, and rates for light and power would have been even lower than they are at present.

**Statement Respecting Rate of Retirement of Bonded Debt
Not Supported by Authority Mr. Murray Quotes**

On page 121 of his report Mr. Murray has made a statement regarding the rate of retirement of bonded debt in municipalities purchasing Hydro service as compared with that of other municipalities. Throughout his report Mr. Murray has based most of his conclusions partly on data which are not cited in his report and which are not accessible either to the Commission or to the public; but in this case he has stated the source from which he purports to have obtained his information, and as that source is a Government publication, it has been possible to examine it and see to what kind of data Mr. Murray is willing to credit conclusions adverse to the Hydro-Electric Power Commission.

Mr. Murray's statement, referred to above, is as follows:

"For the cities of 25,000 or less the 'Municipal Statistics' published by the provincial government show that as of 1920 there were 161 municipalities receiving Hydro Service and 139 not so doing, making a total of 300 municipalities within these latter population limits for which analyses were made.

Figure 13 shows the relation of taxes, bonded debt and sinking funds upon a per capita basis for the 300 municipalities of less than 25,000 inhabitants. Taxes and bonded debt of the municipalities purchasing

Hydro Service were higher, while the retirement of the debt by sinking funds was not being carried out as rapidly by those cities using Hydro Service. This is illustrated by the respective sinking funds in terms of the present bonded debt; the rate of retirement being 13.8% less for the Hydro municipalities than for those not taking Hydro Service."

It will be noted that Mr. Murray has definitely stated as his conclusion ".....the rate of retirement being 13.8% less for the Hydro municipalities than for those not taking Hydro Service."

This statement is repeated in graphic form in Mr. Murray's figure 13. The source of Mr. Murray's information is also definitely stated as follows:

"The last publication of this Bureau" [The Bureau of Municipal Affairs] "is dated February, 1921, and from this has been derived the information contained in Figures 13 and 14." [Figures 13 and 14 illustrate the paragraph quoted above.]

These two statements when taken together prove that Mr. Murray has drawn conclusions which are utterly unjustified by the data upon which they are said to be based, because examination of the booklet to which he appeals as issued by the Bureau of Municipal Affairs under date of February, 1921, discloses the fact that in it there is no mention of how many or which municipalities received 'Hydro' service; also, there is no information given regarding the rate of retirement of bonded debt, nor from which such rates may be deduced. Moreover, the Bureau of Municipal Statistics, which issued the booklet referred to, states that this Bureau does not publish the annual sinking fund payments set aside by the municipalities, the amounts of the debentures actually retired annually, or any other statistics from which it would be possible to determine the rates of retirement of municipal debentures or bonded debt of Ontario municipalities. These comments are offered for the benefit of those who, unwittingly, might conclude that the appeal to authority by Mr. Murray was *bona fide*.

Mr. Murray Singles Out the Nipigon Development for Special Criticism—His Unjust Statements Refuted

The latest municipal power development constructed by the Hydro-Electric Power Commission is the Nipigon plant at Cameron Falls, on the Nipigon river, in the Thunder Bay district. This plant was installed at the special request of municipalities of the Thunder Bay district in order to meet the prevailing power demand and to provide, also, the power necessary for the development of the extensive and varied natural resources of this territory.

Mr. Murray goes out of his way to make adverse criticisms respecting the installation itself and even the necessity for its construction. Mr. Murray devotes a whole section of the detailed portion of his report to "The Nipigon Development for the Thunder Bay System of the Hydro-Electric Power Commission of Ontario." Inasmuch as Mr. Murray has entered upon a special discussion of the Nipigon development and has therein shown that he has no proper understanding of the circumstances which he reviews, it is necessary—if for no other reason than to be fair to the municipalities which have invested in this enterprise—to state why the Nipigon plant was necessary, and, at the same time, to refute the false representations which Mr. Murray has made.

Mr. Murray has not described the circumstances which made it necessary to construct the plant. He has definitely misrepresented the amount of power available under the terms of an important contract,—just as he has already been seen to have misquoted the Power Commission Act of the province of Ontario, and made false statement respecting the subject of flats. Again, in order to cast serious discredit upon the physical advantages of the water power of the Nipigon river, Mr. Murray has failed to emphasize the exceptional storage capacity of Nipigon lake which has an area of 1,530 square miles, while he does emphasize the much inferior storage of Dog lake on the Kaministiquia river which has an area of but 53 square miles. The last mentioned feature of storage is one involving purely engineering considerations, and, inasmuch as Mr. Murray had all the facts before him, it is a matter of surprise that he was induced to make such unprofessional misrepresentations respecting the bearing of well-known physical factors.

**Power Supply for Port Arthur—Fort William
District Not Over-developed**

Dealing with the Nipigon power development, Mr. Murray in his report attempts to show that the Nipigon development should not have been constructed, and states:—

“In reviewing the situation, I am unable to escape the conclusion that there were no economic grounds justifying the construction of the Nipigon Works. The capacity developed on the Nipigon River, plus that available from the Kaministikwia Power Company, provides the people of the Thunder Bay district with three horsepower per capita. This is five times the per capita capacity of that available from all sources, private or governmental, to the people on the Niagara System, and on the basis of the ultimate proposed development for Nipigon and the Queenston-Chippawa plant, then the amounts available per capita to the Thunder Bay district will be nearly four times as great as that on the Niagara System. When comparison is made of the industrial character of these two territories, the over-development at Nipigon becomes apparent. Over-development, of course, reflects greatly into cost of power.”

In the above quotation Mr. Murray contends that the Thunder Bay district is over-developed as regards available power supply. To substantiate his argument he compares the horsepower developed per capita in this district with that in the older parts of the province of Ontario, even though the power requirements of these districts are absolutely non-comparable. In making his per capita comparison Mr. Murray fails to take into account certain important factors. It is true that the per capita capacity provided and also the per capita consumption are greater in the Thunder Bay district than in the Niagara district. A true comparison of the industrial character of these two territories, however, will not make apparent an over-development at Nipigon, as Mr. Murray suggests, but on the contrary will actually justify the provision for a greater per capita consumption in the Thunder Bay district.

In the Thunder Bay district the chief industries to which power is supplied are pulp mills, paper mills and grain elevators. These utilize very large blocks of power and employ a comparatively small number of men, whereas in the older and more thickly settled parts of the Province, not only do the agricultural workers constitute a large proportion of the population but the industries using power are of a much more widely diversified nature and not nearly so basic in character. These are the conditions which of necessity result in a smaller use of power per capita in the Niagara district.

**Kaministikwia Power Company Unable to Supply Port Arthur
with Firm Power of More than 5,000 Horsepower**

Mr. Murray on page 15 of his report states:

“Section 2 [3] of the contract which the Commission held with the Kaministikwia Power Company shows that all power in excess of 6,000 horsepower would come to the Commission at \$14.00 per horsepower year, with the contract holding (Section G, page 144) for forty years.”

and on page 144, referring to the terms of the original contract respecting the cost of power delivered to Port Arthur by the Commission, he states:

"This feature of the contract gave the municipality of Port Arthur a virtual guarantee that, for at least 10,000 horsepower the maximum wholesale cost of power delivered by the Commission would not, during the next ensuing forty years, exceed \$17 per horsepower."

Now, under the contract which the Commission made with the Kaministikwia Power Company the Company was bound to supply power up to a maximum of 5,000 horsepower and, *provided* the Kaministikwia Power Company had the additional power available when required, this maximum amount of 5,000 horsepower was to be increased to 10,000 horsepower or more. A vital clause in the agreement between the Commission and the Kaministikwia Power Company—but one which Mr. Murray found it convenient to omit from his report,—reads as follows:

"If after the Commission has ordered 5,000 horse power a further order is given and the Company has no power beyond 5,000 horse power available, the Commission shall release the Company from all covenants to furnish power over the said 5,000 horse power or procure the right for the Company to develop the water power at Silver Falls,"

Had Mr. Murray quoted this paragraph he would have disclosed the fact that *the Commission had an effective option on only 5,000 horsepower of firm power and not on "at least 10,000 horsepower," as Mr. Murray states in his report.* Under this contract, the only condition upon which the Kaministikwia Power Company would give the Commission the right to take 10,000 horsepower was that the Commission should "procure the right for the Company to develop the water power at Silver Falls"—i.e. the Dog Lake site. To this proposal, however, the municipalities absolutely refused to consent.

**Kaministikwia Power Company Unable to Supply
the General Power Requirements of Port Arthur—
Fort William District**

Mr. Murray represents that the Kaministikwia Power Company had available sufficient power to meet the requirements of the entire district. This, however, was far from being the case. In January 1921, the Fort William Paper Company contracted for the larger portion of the surplus capacity of the Kaministikwia Power Company and the latter Company was therefore unable to consummate a contract desired by the Great Lakes Paper Company for 10,000 horsepower, owing to the fact that all of the Power Company's surplus power had been pledged, as indeed Mr. Murray in his report himself admits when he states:

"However, the Great Lakes Pulp & Paper Company never entered into a contract with the Commission for the purchase of power and as late as 1920 was negotiating with the Kaministikwia Power Company for a supply of power, which contract they were unable to consummate, as the Kaministikwia Power Company, Ltd., meantime had contracted with the Fort William Paper Company for the larger portion of its surplus power; including that then being supplied to the Hydro at Port Arthur."

When it is remembered that, at this time, over 10,000 horsepower was being delivered from the Nipigon plant to supply the requirements of the city of Port Arthur and other consumers in the district, it is perfectly evident that

the power resources of the Kaministikwia Power Company were quite inadequate to meet the existent and future requirements of the Thunder Bay district. Had the Commission depended upon the Kaministikwia Power Company for a supply of power to the Thunder Bay district, there would have resulted an early and serious shortage of power, and the resulting losses to the district would have far outweighed the additional cost which was entailed by constructing the Nipigon plant at a time of high prices for material and labour.

Mr. Murray, in order to support his contention that the plant of the Kaministikwia Power Company was adequate to supply the power demands of the district, refers to the *installed capacity* as approximating 35,000 horsepower. He states:

"On the other hand, investigation discloses that the Kaministikwia Power Company, having a plant capacity of 35,000 horsepower at Kakabeka Falls in 1917, had available at that time 15,000 horsepower of excess capacity which was not then contracted for, and in addition owned the rights on the Kaministikwia River for other developments of a capacity equally as large as that at Kakabeka Falls."

It is true that equipment for generating 35,000 horsepower is installed, but owing to water supply, the *continuous power* of the Kaministikwia plant—that is, the kind of power that is required by most of the basic industries, actual and prospective, and in particular the pulp and paper industry—is *limited to about 16,000 horsepower*.

The Dog Lake power site is the only other site on the Kaministikwia river where power in excess of 3,000 horsepower could be developed. The Kaministikwia Power Company does not own these water-power rights. Mr. Murray's statement that the Company "owned the rights on the Kaministikwia river for other developments of a capacity equally as large as that at Kakabeka Falls," is therefore, absolutely incorrect.

**Commission Has Published a Statement Respecting
Nipigon Power Development and Thunder Bay District**

The Hydro-Electric Power Commission of Ontario has recently issued an illustrated booklet entitled "The Nipigon Hydro-Electric Power Development constructed and operated for the Municipalities of the Thunder Bay District by the Hydro-Electric Power Commission of Ontario." This publication gives an historical survey of the events leading up to the decision of the Commission to develop Nipigon power and deals also with the questions of rates, consumption of electrical energy, power demands, and probable future markets for power. A chapter is devoted to the "Advantages of the Twin Cities," and in an Appendix a description is given of the physical and other features of the Nipigon development. To users, and prospective users of power in the Thunder Bay district the information given in this pamphlet will prove of exceptional value; and, moreover, its contents constitute an extended and irrefutable answer to Mr. Murray's statements respecting the Nipigon development.

Although the publication just referred to shows how the pressing demands for power became manifested, nevertheless, it is desirable here to demonstrate the substantial nature of these demands by quoting a few authoritative statements upon this important phase of the subject under discussion.

The Commission Decided to Proceed with Nipigon Development after Receipt of Urgent Demands from The Provincial Government and the Municipalities

The Hydro-Electric Power Commission at one time considered obtaining additional power for the Thunder Bay district from a development on the Kaministiquia river at Silver Falls—the Dog Lake site—where a maximum of some 20,000 continuous horsepower is available. Before the development of the Dog Lake site was started, however, the Provincial Government granted certain large timber concessions in the Thunder Bay district on conditions which demanded their early development. Such development would, of necessity, involve the use of large blocks of power.

A number of urgent resolutions had been received from municipalities at the Head of the Lakes pressing the Commission to develop sufficient power to take care of the immediate requirements of the district. One of these resolutions from the City Council of Port Arthur, dated February 14th, 1918, states:

“BE IT THEREFORE RESOLVED that this Council places before Sir Adam Beck, the urgency of the power requirements of Port Arthur and that he be asked to immediately and definitely decide upon the most feasible source of supply,”

also, the Public Utilities Commission concludes:

“BE IT RESOLVED, that the attention of the Hydro-Electric Power Commission be again drawn to this very important question of future power supply and the critical situation which is liable to develop,”

On June 13th, 1918, and again on July 5th, communications were received from the Mayor of Port Arthur pointing out the necessity for immediately going ahead with the development of power for the cities of Port Arthur and Fort William.

Thus the communication of the 13th June, 1918, states:

“Both Cities have placed themselves unreservedly in your hands, and therefore, our hands are tied as to any further action, and the responsibility of furnishing us with power rests entirely with you there will come a time when it will be too late to complete development work and get Nipigon power delivered to us.”

The Provincial Government also wrote the Commission on June 14th, 1918, emphasizing the urgent necessity of the Commission at once developing sufficient power to take care of the government timber concessions granted in the district. Premier Sir William Hearst's letter of this date also states that

"the Government could not consider any plant for the development of the water powers at Nipigon without provision being made to supply the necessary powers required for the operation of the plants demanded by the terms of the concessions in question I simply want to point out, at the earliest possible moment, that no power development at Nipigon could be considered that will not provide for the power requirements necessary for the development of the Nipigon Pulp Concessions."

Acting upon the numerous and urgent demands—of which those just cited are typical—from the Municipalities and from the Provincial Government, and taking into consideration, also, other factors including the physical characteristics and capacities of the alternative power sites, the Commission decided not to undertake the Dog Lake development at that time but to proceed with the Nipigon development, which possesses an ultimate capacity sufficient not only to meet the immediate requirements of the district, but also to serve for some time to take care of future needs. Thus the forehanded action on the part of the Hydro-Electric Power Commission in developing the Nipigon power site has secured to the Thunder Bay district an ample supply of power at attractive rates,—the prime requisite for a healthy expansion of industrial activities based upon the utilization of the natural resources of the district.

Mr. Murray Misleads Respecting Storage of Nipigon River

In his report Mr. Murray, by an unpardonable failure to emphasize essential facts, belittles the power possibilities of the Nipigon river and especially the new power development at Cameron Falls. The comparison he makes of the Nipigon river with the Kaministiquia river is simply absurd.

In the first place, Mr. Murray's presentation will mislead any who may read his report and who may not be familiar with the true conditions. He sets forth in a special quotation a statement from the Water Power Branch of the Department of the Interior, Ottawa, as follows:

"No storage by artificial means is maintained in the Nipigon watershed."

Mr. Murray then refers to certain features of the Kaministiquia river and power development thereon and, along with other facts, states that the Dog Lake storage has an area of 53 square miles.

The accompanying outline map shows Lake Nipigon, area 1530 square miles, which constitutes the storage reservoir available to regulate the flow for all power sites on the Nipigon river, and—inset to the same scale—Dog lake, area 53 square miles, which is utilized as a storage reservoir for regulating the flow of the Kaministiquia river. The map demonstrates very clearly the relative magnitude of these two lakes. It is interesting to note how Mr. Murray fails to reveal the great amount of storage behind the Nipigon River development. It is true that a regulating dam is not maintained at lake Nipigon because, owing to the exceptionally good natural regulating properties of lake Nipigon, it is not necessary, as yet, to control the level and outflow from the Lake. Provision for a dam when necessary, is, however, included in the Commission's plans.



OUTLINE MAP SHOWING LAKE NIPIGON, WHICH CONSTITUTES THE STORAGE RESERVOIR AVAILABLE TO REGULATE THE FLOW FOR ALL THE POWER SITES ON THE NIPIGON RIVER, AND—INSET TO THE SAME SCALE—DOG LAKE, WHICH IS UTILIZED AS A STORAGE RESERVOIR FOR REGULATING THE FLOW OF THE KAMINISTIKWIA RIVER.

AREA

LAKE NIPIGON 1530 SQUARE MILES.
 DOG LAKE 53 SQUARE MILES.

ESTIMATED STORAGE

LAKE NIPIGON 4,896,000 ACRE FEET
 DOG LAKE 547,000 ACRE FEET

MR. MURRAY REFERS POINTEDLY TO THE DOG LAKE STORAGE BUT CONVENIENTLY FAILS TO EMPHASIZE THE MUCH GREATER STORAGE OF LAKE NIPIGON.

Advantages of the Nipigon River

The great advantage of the Nipigon river over the Kaministiquia river for power development, both from economic and engineering standpoints, is revealed conclusively by the following tabulation of data relating to the two streams.

TABLE II
COMPARISON OF POWER POSSIBILITIES
NIPIGON AND KAMINISTIKWIA RIVERS

	Drainage Area	Area of Lake	Estimated Depth of Storage	Volume of Storage	Mean Dependable Flow
	<i>sq. miles</i>	<i>sq. miles</i>	<i>feet</i>	<i>acre feet</i>	<i>c.f.s</i>
Kaministiquia River and Dog Lake.....	2,670	53	16	547,200	630*
Nipigon River and Nipigon Lake.....	9,100	1,530	5	4,896,000	6,500†

POWER SITES

Site	Head in feet	Estimated Horsepower at load-factor of		
		100 per cent	75 per cent	50 per cent
KAMINISTIKWIA RIVER				
Kakabeka Falls	178	16,000	21,300	32,000
Dog Lake	340	19,500	26,000	39,000
Total.....		35,500	47,300	71,000
NIPIGON RIVER				
Cameron Falls	78	50,000	66,700	100,000
Alexander Landing....	53	33,100	44,100	66,200
Pine Portage.....	55	32,500	43,300	65,000
Virgin Falls.....	42	24,800	33,000	49,600
Total.....		140,400	187,100	280,800

*At Dog Lake site; the flow at Kakabeka Falls is 1,000 c.f.s.

†For all sites on the Nipigon River.

NOTE: The Hydrometric data employed are based on the available records. The estimated capacities for all undeveloped sites are based on 80 per cent efficiency. The estimated capacities for the Kaministiquia Power Company's development at Kakabeka Falls are also based on 80 per cent efficiency. The physical features of this plant include pipe lines in which there is considerable friction loss and also horizontal units which were built some years ago and at a time when efficiencies obtainable were lower than at present. The Nipigon plant is much more compact in design, and includes the most modern vertical-runner turbines. An efficiency of 87 per cent is used as a basis for the estimated capacities at Cameron Falls.

The above table emphasises the remarkable amount of storage available on the Nipigon. The comparison also reveals the exceptional advantage of the present Nipigon development at Cameron Falls, as well as the advantages of the other power sites on the Nipigon river as compared with either the

Kakabeka Falls development of the Kaministiquia Power Company or with the only other large power site on the Kaministiquia river, namely, the Dog Lake site.

From the table presented it will be seen that the total drainage area of the Nipigon river is nearly four times that of the Kaministiquia river. The area of lake Nipigon is thirty times the area of Dog lake and the amount of potential storage on lake Nipigon is approximately nine times that available on Dog lake. The mean dependable flow obtainable on the Nipigon river is over six times greater than that obtainable on the Kaministiquia river at Kakabeka Falls. The aggregate ultimate power possibilities of the four large power sites on the Nipigon river is about four times as great as that of the two large power sites available on the Kaministiquia river. Why did not Mr. Murray, as an engineer, set forth these facts, essential as they are to any such comparison as he makes?

Any satisfactory power development in the Thunder Bay district must of necessity be able to take care of high-load-factor, twenty-four-hour power loads for large and basic industries such as pulp and paper mills, and must take care also of the power requirements of the large grain elevators; it should also be able to supply power for the development of the mineral resources of the district. For meeting such circumstances, the facts submitted respecting the two rivers prove beyond question that the Commission's judgment in choosing the Nipigon development was the only logical solution of the problem.

In accordance with the general experience of new hydro-electric power plants for the development of new industries, it is of course to be expected, during the period of construction and even for some time after the plant is in operation—when the load on the plant is comparatively small—that the actual cost per horsepower of power developed at the Nipigon plant will be somewhat higher than the cost per horsepower of power as supplied to the Commission under the original restricted contract with the Kaministiquia Power Company. Owing to the surplus which Port Arthur has been able to accumulate under the prevailing rates for light and power, it is not anticipated that it will be necessary—even during the period within which the load is being built up—to increase the rates at which power and light are now being supplied to consumers in Port Arthur. It is the belief of the Commission that in the development of the natural resources of the district no factor will prove more important than the ample supplies of hydro-electrical energy now available at cost from the Municipalities' power development on the Nipigon river.

From the foregoing brief review, it is seen how urgent were the demands of the municipalities of the Thunder Bay district for large increases in their supply of hydro-electrical energy. It is seen, also, how definite were the expressed representations of the Provincial Government for sufficient power for the pulp and paper industries, and in addition, it is seen how the judgment

of the Hydro-Electric Power Commission of Ontario, based as it is upon an independent and comprehensive field survey of the power markets and other governing factors, approved of the Nipigon development. Against the considered judgment of all the public authorities immediately interested, one has simply the 'conclusion' of Mr. Murray as expressed in the first quotation given in this discussion of his reference to the Nipigon development. When one considers the ignorance manifested by Mr. Murray of the power problems at the Head of the Lakes, it is remarkable that he should have displayed such unusual assurance in expressing himself as he has done. As a matter of fact, Mr. Murray's unprofessional handling of the engineering data relating to the subject of storage on the Nipigon river, is, of itself, sufficient to discredit his whole presentation.

QUEENSTON-CHIPPAWA POWER DEVELOPMENT

On behalf of the municipalities of the Niagara district, the Hydro-Electric Power Commission has constructed what is known as the Queenston-Chippawa Power Development for the utilization of the water power of the Niagara river. This installation when completed will be the largest individual water power development in the world. Previous power developments on the Niagara river only utilized that portion of the total fall of the river which occurs in the vicinity of the Falls, but the basic conception of the Queenston-Chippawa development is the utilization of the greatest possible amount of the total fall of the Niagara river between lake Erie and lake Ontario at the highest possible efficiency. Of this total fall of 327 feet, 305 feet has actually been made available as a working head at the Queenston power house. This development, therefore, makes much more efficient use of the Niagara water than is made by any other Niagara power plant.

The general scheme of development comprises an intake structure in the Niagara river at Chippawa; the deepening and widening of the Welland river between Chippawa and Montrose, a distance of $4\frac{1}{2}$ miles; the construction of a canal $8\frac{1}{2}$ miles long from Montrose to the forebay and screen-house at a point on the cliff about a mile south of the village of Queenston; and the construction and equipment of a power house in the gorge immediately below the forebay.

No doubt, Mr. Murray knew full well that it would be futile for him to attempt to discredit the outstanding and well recognized engineering and other advantages of the Queenston-Chippawa development; and consequently, he has not undertaken to deal with this portion of the Commission's operations as he so unfairly does with the Nipigon development situated as it is in a region comparatively little known as contrasted with the widely known Niagara district. Mr. Murray, therefore, confines his attack on the Queenston-Chippawa development chiefly to the publication of his 'opinion' that it was not desirable to have gone ahead with this project during the period of the war, involving as it did, such high costs of labour and material. Mr. Murray also contends that inasmuch as the cost of power to be generated

by this development will be substantially higher than anticipated, the ultimate rates for electrical energy to the consumer will be so high as to constitute a serious burden.

The Allied War Needs Were a Governing Factor

With respect to Mr. Murray's contention that it was not advisable to have proceeded with the Queenston-Chippawa development, it may be definitely recorded that Mr. Murray's "conjecture" given below:

"the Queenston-Chippawa development was prosecuted during that period with little hope, I would conjecture, that power could be received from it to help out the war load."

is absolutely incorrect.

Had Mr. Murray been living in the Dominion of Canada in 1917, he would perhaps have been in a better position to realize that at that time it was utterly impossible for human foresight to determine when the war would end, and on the part of all interested there was advocated the policy that there should be no slackening of any effort which would make towards the successful termination of hostilities. Every resource available to the citizens of Ontario was being utilized in the production of munitions and other war supplies. The outstanding problem in this great effort was the insufficient supply of power. A Power Controller had been appointed by the Dominion Government and under his orders the use of power for non-essential industries was being curtailed, the amount of street-lighting was reduced, window lighting was prohibited, and commercial industries either had their power cut off, or reduced to a point which entailed great financial losses; in many cases almost complete paralysis of business was experienced. At this period the Hydro-Electric Power Commission was supplying power for the operation of over 360 plants manufacturing munitions and war supplies, and these plants were using over 80 per cent of the entire power supply in the Niagara district.

Now, all information such as that just recorded was given to Mr. Murray along with the other data relating to the activities of the Commission. It is noteworthy, however, that Mr. Murray has seen fit to omit reference to these exceptional conditions, because such reference would not have fitted in with the general tenor of his report. During the war no such comment as Mr. Murray now offers in his report would have been tolerated in any of the countries of the Allies.

Growth of the Use of Hydro-Electrical Energy in the Niagara District

Apart from the phenomenal growth in power demand caused by the utilization of electrical energy for the production of munitions and other war supplies, and indeed long before the stimulation of power demand due to the war was noticeable, there was a very remarkable growth in the increased amounts of power being demanded by the municipalities of the Niagara system served by the Hydro-Electric Power Commission.

The 100,000 horsepower originally contracted for by the Commission was all absorbed within five years of the time the Commission first began marketing power. The following table demonstrates the growth of hydro-electric activities in the Niagara district:

TABLE III
GROWTH OF THE USE OF HYDRO-ELECTRICAL POWER
IN THE NIAGARA DISTRICT

Year	Number of Municipalities	Number of Townships	Total Number of Consumers	Power Supplied to Municipalities and Customers of the H.E.P.C.*
1910	9	....	.....	603
1911	23	....	.....	18,072
1912	33	....	.....	37,720
1913	40	7	52,245	50,478
1914	61	10	78,925	82,161
1915	83	15	99,495	106,154
1916	101	18	124,973	144,123
1917	111	24	140,178	239,761
1918	115	25	150,207	250,190
1919	118	26	174,989	264,872
1920	123	26	200,825	282,791
1921	127	34	218,292	317,837
1922	131	44	.....	360,268†

* December load. † June load.

Foreseeing the urgent demands for increased power, the Commission, as early as 1912, was constrained to commence active arrangements for obtaining an additional supply of power to meet the requirements of the Niagara district, and in 1914-15 an estimate was prepared which was submitted to the Provincial Government with a request for authority to proceed with the construction of the proposed Queenston-Chippawa plant. The plant contemplated in this first estimate was to have a capacity of 100,000 horsepower and this development under conditions of labour and material prevailing at that time was estimated to cost \$10,500,000. The Provincial Government, however, did not approve of the Commission proceeding with this early proposal, and it was not until 1916-17 that it did approve of the project of constructing the Queenston-Chippawa development.

The plan then approved was for a larger development than that provided for in the original estimate of 1915. It was now contemplated to develop 300,000 horsepower by means of a canal of suitable capacity. Two estimates of cost for this capacity based on different methods of construction were submitted. Using ordinary types of construction plant, the cost was estimated at \$29,000,000 but if an improved type of plant were to be employed, the cost was estimated at from \$24,000,000 to \$25,000,000. Both these estimates were based on the low costs of labor and materials which prevailed in 1916. At the time the estimates were made it was, of course, impossible for anyone to foresee that before the work could be completed rates of wages would have increased by over 125 per cent and unit costs of construction materials by at least 100 per cent over the 1916 costs. Other items of increased cost which could not have been foreseen were the duty, surtax and

exchange on the cost of material and equipment which had to be imported from the United States, as, owing largely to war conditions, it could not be obtained in Canada.

At the close of the war, special efforts were everywhere made to restore industry to its normal basis. In Ontario, these efforts were so far successful that the discontinued war loads were almost immediately re-absorbed, and as early as 1919, the ever increasing demand for power in the Niagara system made it evident that even a 300,000 horsepower development would only suffice to meet the requirements for a relatively short period; on account of this and other factors it was accordingly decided to provide for an estimated capacity of 450,000 horsepower. This was to be accomplished by deepening the power canal and lining it throughout with concrete. After the work had been initiated and when the success of the improved methods employed in the construction of the canal had been demonstrated, it became apparent that the smoothness of finish of the concrete lining, and also the superior alignment of the sides of the canal, would facilitate the carrying of a larger volume of water than had originally been estimated. Subsequent engineering examination and computation promises that an ultimate capacity of some 550,000 to 600,000 horsepower will be available.

A Load Aggregating 150,000 Horsepower Awaited the First Generators at the Queenston-Chippawa Plant

Above there are given data showing the rapid growth of the Commission's Niagara system; a few particulars as to the load conditions under which the first generators installed at Queenston have been put into service will here be of interest.

The power requirements of the Niagara System are such that the Commission some time ago was compelled to enter into day-to-day contracts with private companies on both sides of the Niagara river for supplies of power aggregating 90,000 horsepower. The only circumstance which made it possible to secure the temporary use of this power was that the loads on these private plants were very much reduced owing to the commercial depression at that time prevailing in the adjacent districts of New York State and Ontario. Until the first two generating units were ready at the Queenston power house, the Commission, therefore, was able fortunately to make day-to-day contracts for the supply of the required power. Had the construction of the Queenston-Chippawa power project been delayed, it is not improbable that the Niagara system would have had to manage without some 90,000 to 150,000 horsepower, for so soon as customers holding contracts for this power began to find uses for it under improving commercial conditions, the private power companies would have had to cancel their contracts with the Commission and allow the power previously contracted for to go to its regular customers.

Lack of this large amount of power would have been a very serious matter for Ontario.

The first generating unit of the Queenston-Chippawa plant was put into

commercial operation on February 1st, 1922, and since that time has been carrying a load of about 60,000 horsepower; the second unit was started on March 15th, 1922, and the two units are now carrying approximately 118,000 horsepower.

The above load has been put on these generators without taking any load away from the other plants of the Commission and without carrying any part of the 50,000 horsepower which is supplied to the Commission by the Canadian Niagara Power Company. These conditions obtain in a period of commercial depression and the very evident signs of trade revival which are now apparent indicate clearly that the initial works of the Queenston-Chippawa Power Development will be completed none too soon to cope with the power situation of the near future.

Mr. Murray Presents Estimates of the Cost of Niagara Power Based Upon His Own Hypotheses

Having attempted, in the manner above indicated, to discredit the Queenston-Chippawa development on the basis of its having been begun and carried forward under conditions of high cost of labour and material due to the Great War, Mr. Murray next attempts to establish his contention that the resulting cost of power from the Queenston-Chippawa development will be so high as to be a serious burden upon the public receiving it.

In order to arrive at the cost of power from the Queenston-Chippawa plant, Mr. Murray adopts his usual methods—methods, indeed, which correspond to those already disclosed in the earlier portion of this discussion. That is to say, when Mr. Murray wishes to prove that the Commission exercises “unlimited” authority, he misquotes and alters statutory verbiage in order to suit his purpose; if flats, having been granted, are a menace to his argument, he boldly asserts that none have been granted; if storage facilities exist that would invalidate his contentions, they must needs be discounted, and so on. Similarly, in dealing with the cost of Queenston-Chippawa power, Mr. Murray builds up high estimated costs by a process of inflation. If, for example, the regular rate of interest, as paid by the Commission, of 5.75 per cent is too low, Mr. Murray raises it to a conventional figure of his own, namely, to 8.15 per cent, and this, in one instance, has given him a fictitious increment of cost of \$1,652,500. Thus, Mr. Murray complacently employs figures of cost according to his fancy. In no other manner could he deduce the high costs per horsepower-year which he does.

In proceeding, it is well to refer to the manner in which Mr Murray introduces his dissertation upon *his* high estimated costs for Niagara power. In commencing, Mr. Murray postulates certain quantities of water to be available under certain conditions. Then he says that with so much water only so much power-producing equipment at Niagara could be operated. Thus, for example, under one of his hypotheses, Mr. Murray states that 162,000 horsepower out of the 202,000 horsepower capacity of the Ontario Power Company would have to be scrapped, because, says he, no water for the production of power would, under certain conditions, be available to the

Ontario Power Company. Then, upon *this* hypothesis, Mr. Murray proceeds to make an estimate of the future cost of power to the municipalities of the Niagara System.

It may be commented, that the diversion of water from the Niagara river is covered by the International Boundary Waters Treaty of 1909 between Great Britain and the United States. Internationally, the interpretation of the Treaty rests with the high contracting parties. Nationally, the apportionment of the amount of water allotted to each country is a domestic problem and concerns only that country which, in each particular case, has the jurisdiction. Mr. Murray's views respecting the details of the manner in which Niagara water may be apportioned under assumptions which he himself has elected, are not concurred in by the Commission. There is no need to discuss this aspect of the subject. However, it will not be amiss to examine Mr. Murray's estimates of the cost of Niagara power based upon his own assumptions and in the form in which he himself has chosen to present them. If the fictitious and inflated character of costs deduced by the methods he has employed be demonstrated, nothing further is required.

Such demonstration will now be given and, for purpose of illustration, attention will be directed to Mr. Murray's presentation of the cost of power from the Niagara river when the Queenston-Chippawa development has an installed capacity of 575,000 horsepower and a load therefrom of 540,000 horsepower. With the exception of the interest charges for the Ontario Power Company, which have been increased since 1920, all costs used as a basis for checking the estimates under discussion are for the year 1920. As a matter of fact, however, it is well to remember that the extreme costs of labour and material for the year 1920 are already substantially lowered. Of the ten items making up the cost of power from the two plants there is not a single item which Mr. Murray has estimated correctly; his errors in the various items range from 20 to over 1,000 per cent, and aggregate a total of over five million dollars. Furthermore, it will be perceived that in nine of the ten items, Mr. Murray's estimates are in excess of the correct figures, consequently they represent the future cost of power to be a great deal higher than it actually will be. Some of Mr. Murray's errors may be explained as simple carelessness—as, for example, when adding up his items he has made an error of \$30,000. When, however, two of his "mistakes" are over a million and a half dollars each out of a corrected total of only \$7,200,000, the probability that such items have not wittingly been inflated becomes very remote. Some of these discrepancies will now be considered in detail.

Mr. Murray Absurdly Overestimates the Renewal Reserves of the Ontario Power Company

Mr. Murray's estimate of the renewal reserves required to be laid aside for the Ontario Power Company's plant is simply absurd; it is more than ten times too much.

The basic assumption on which Mr. Murray has made his estimate of the cost of Niagara power is that the plant of the Ontario Power Company, on account of lack of water which Mr. Murray proposes to use otherwise, will be scrapped, with the exception of 40,000 horsepower held as stand-by. In spite of this fact that 162,000 horsepower is thus to be scrapped under his own assumption, Mr. Murray has included in his estimate a provision for *the renewal* of this 162,000 horsepower of the scrapped plant, and allows the absurd sum of \$2,100,000 *annually*, in addition to a provision of \$78,000 in respect of the 40,000 horsepower which is to be retained. The annual amount Mr. Murray has thus allowed for renewal of the superseded part of the plant is enough to rebuild it entirely every three or four years, although under Mr. Murray's assumption *there is no intention to rebuild it* at all. This \$2,100,000 is, therefore, pure inflation—not a cent of it is needed even under Mr. Murray's assumed conditions.

It is possible that Mr. Murray may have made this blunder through confusion in his own mind regarding the respective functions of renewal reserves, of reserves for obsolescence, and of sinking fund or amortization reserves. He endeavours to justify his estimate of \$2,178,000 for "renewals" by saying:

"The obsolescent capacity must be amortized over a relatively short period and a 9%* amortization rate has been used for this portion of the investment, while for the balance of the capacity, the same rate for renewals has been taken as was used by the Commission's engineers."

That Mr. Murray's expressed ideas on this subject are much confused—whether wittingly or otherwise—is evident from the preceding quotation. He is apparently endeavouring to excuse his absurd allowance of \$2,100,000 for "renewals" on the ground that it is not all for renewals, but partly for "amortization." The allowance, however, is seen to be all the more indefensible if considered as amortization because Mr. Murray has separately taken care of amortization by having provided an additional item of \$512,000 in respect of sinking fund reserves on this very plant of which he is scrapping the larger part. Moreover, inasmuch as \$320,000 annually is ample to cover the sinking fund requirements when due, Mr. Murray by providing \$512,000 would in this item alone, be setting aside 50 per cent. more than is required.

The fallacy of Mr. Murray's argument quoted above is evident when it is remembered that the only reason he assigns for shutting down the Ontario Power Company's plant is in order to develop approximately twice the power with the same water by using it in the Queenston plant. The power, therefore, is not lost but doubled, and hence the value of the Ontario Power Company if its water is used in the Queenston-Chippawa development is really greater than before.

Besides being unnecessary, the levying of such an extra charge of \$2,100,000 against the cost of power would be extremely foolish and would result in great injustice to power consumers. Mr. Murray thereby would add an

* Incidentally, it may be remarked that Mr. Murray has actually used not a 9% but over a 30% amortization rate "for this portion of the investment."

unwarranted cost of nearly \$5.00 per horsepower for about three years, or until the whole value of the 162,000 horsepower of the plant he proposes to scrap was amortized. Then the cost of power would drop, not by \$5.00 alone, but also by the amount of the interest and sinking fund on that portion of the capital costs amortized.

In any event, whether through confusion of his ideas or merely through the desire to make the cost of power appear as high as possible, it is certain that Mr. Murray's estimate, on this item alone, is more than \$2,000,000 too high.

Mr. Murray's General Inflation of Estimates

Six other items which Mr. Murray has unreasonably overestimated, while less individually, nevertheless aggregate a very large amount in excess of the correct figures. For instance, Mr. Murray apparently neglects the fact that the costs of operation, etc., per horsepower are much smaller for a very large and modern station like the Queenston station, and thus he unjustifiably overestimates this item. Again, when the nature of the physical installation at the Queenston-Chippawa development is considered, the renewal reserves for this plant are too high. In all, these six small items are overestimated by about \$1,500,000. One item only has been underestimated by Mr. Murray, but this was due to circumstances occurring after he had assembled his data. However, for the underestimated item proper allowance has been made. One item was nearly correct.

Mr. Murray's Gross Error Respecting the Interest Charges Applicable to Queenston-Chippawa Development

Mr. Murray's calculation of interest charges on the Queenston-Chippawa development forms a particularly flagrant instance of his general policy of inflation of estimates.

The capital cost of the development is accepted by Mr. Murray as \$69,000,000 and he estimates the annual interest charges thereon at \$5,620,000. By division it is evident that Mr. Murray has employed *an interest rate of 8.15 per cent.*, but he carefully refrains from all mention of this fact. Mr. Murray even admits, a few pages before, that *the average rate of interest which the Commission will pay on its borrowings is only 5.75 per cent.*, and he uses that rate in calculating interest for his first estimate. The Commission has never paid an interest rate even approaching 8.15 per cent.

Using the correct interest rate—5.75 per cent.—it is found that the item which Mr. Murray without the slightest justification states to be \$5,620,000, should be \$3,967,500, and hence on this item alone Mr. Murray has inflated his estimates by \$1,652,500.

By such artifices as have just been described, Mr. Murray has estimated a total annual production cost for power of \$12,310,000—as against a corrected total even under his own assumptions, of \$7,200,000. Thus he has overestimated the cost of generation by \$5,000,000 or 70 per cent. In addition, in calculating the cost of power to the Niagara system, he has underestimated the revenues

of the Ontario Power Company from its own customers, and overestimated the amount of power taken by them, and thereby increased the inflation of his estimated cost of power to over 80 per cent.

Summing up Mr. Murray's handling of this estimate, it is found that in the first place he has based it on gratuitous assumptions, and then, without justification, he has overestimated all the items of cost but two to a total extent of \$5,000,000 or 70 per cent. He arrives at a figure of \$25.60 per horsepower per year, whereas a corrected estimate under *his* assumptions is only \$14.00 per horsepower per year.

It is unnecessary to deal specifically with Mr. Murray's other estimates, because in general, his procedure involves similar hypothetical assumptions of his own, as well as incorrect methods of dealing with estimated costs. In his estimates, for example, of the cost of power to the municipalities of the Niagara district at the busses of the generating plants at Niagara, when the capacity of the Queenston-Chippawa plant is 275,000 horsepower, Mr. Murray under different assumptions, arrives at estimated costs of \$31.10, \$23.40, and \$21.30 per horsepower-year, whereas had he rightly employed the data available to him he must have arrived at an entirely different conclusion. If a reserve capacity of 55,000 horsepower is maintained the cost per horsepower of peak load will be approximately \$18.00, while the cost per horsepower of machine capacity will be about \$15.50.*

In discussing these estimates of Mr. Murray's it must fully be appreciated—as indeed, was emphasized above,—that the Commission does not accept or concur in the assumptions upon which Mr. Murray predicates his estimates. Mr. Murray himself apparently does not regard his assumptions as necessarily stable, because he bases another estimate upon still different assumptions and then concludes that the ultimate cost of Niagara power will only be \$12.60 per horsepower-year. It is the judgment of the Commission's engineers that the ultimate cost of Niagara power will be substantially lower than even the figure of \$12.60 which Mr. Murray supplies.

Even Under the Present Low Rates the Revenues of the Municipalities, with but Few Exceptions, are Sufficient to Meet all Charges on Queenston-Chippawa Development

Reverting again to the question of cost of Queenston-Chippawa power: Mr. Murray makes the following statement in regard to the effects of the high costs:

"I cannot escape the conclusion that the burden of its" [Queenston-Chippawa development] "costs must now be felt in a very material increase of cost to the municipalities of Ontario for many years."

With the return to more nearly normal commercial conditions it is anticipated that during the year 1923 the load on the Queenston-Chippawa development will reach a figure of from 200,000 to 250,000 horsepower. With

*These estimates relate only to the cost of power generated for the Niagara System. Mr. Murray does not take into account the power purchased by the Commission from the Canadian Niagara Power Company. The price of this power would reduce the average costs of power to the Niagara System below the estimates above presented, by at least 50 cents per horsepower-year. Further, it may be commented that in all the above estimates there have been included the full sinking fund charges for amortization of capital, which ordinarily are not levied for a period of years after the commencement of operation. For the first years, due to the deferment of sinking fund charges, the cost of power will be over \$1.50 per horsepower-year less than the estimates above presented, and including the 50 cents just mentioned, the cost will be \$2.00 less.

this load on the plant the average cost of generation of power for the Niagara system will probably not be increased by more than \$4.00 per horsepower-year over the average cost of generating the power supplied to the Niagara system in the year prior to the construction of the Queenston-Chippawa development. The temporary increase of approximately \$4.00 per horsepower in the wholesale cost of generating power will not, in the majority of the municipalities, necessitate any material increase in the rates to consumers, as on the basis of the low rates charged in 1921 the average surplus of the municipalities in the Niagara system for that year exceeded \$4.00 per horsepower. Moreover, the cost of power from the Queenston-Chippawa plant when developing about 250,000 horsepower will be less than the cost of purchased power available at lowest present prices now quoted from the private companies at Niagara Falls.

The present situation may be summed up as follows:

Without the new development, the municipalities would now be experiencing a power shortage of over 125,000 horsepower and it would be daily increasing.

For such small amounts of power as the power companies have for sale, the price demanded is higher than the cost will be for power from the Queenston-Chippawa development with but the said load of 250,000 horsepower.

An increase in the cost of power was inevitable and to be expected on account of the situation brought about by the War, but even this will be minimized by means of the Queenston-Chippawa development.

Inasmuch as the Queenston-Chippawa plant will ultimately be developing 550,000 to 600,000 horsepower, there will, in addition to the initial development of 275,000 horsepower, be some 300,000 horsepower eventually available for future requirements. As this additional power is marketed, there will result to the municipalities a continually decreasing average cost of power.

Consequently, in spite of Mr. Murray's assertion that the policy of construction of the Queenston-Chippawa development was economically wrong, it is obvious that it was, and is, the cheapest and best solution of Ontario's power problem, as well as the only adequate one. In the majority of municipalities it will not be necessary, even temporarily, to increase materially the retail rates.

From the foregoing comments upon Mr. Murray's discussion of the Queenston-Chippawa development, it will be seen that he has no warrant for his conclusion and all that is necessary for him to do in order to "escape the conclusion"—using his own expression—is to correct the blunders he has made.

MR. MURRAY'S UNPROVED ASSERTIONS RESPECTING COMPARATIVE POWER COSTS IN VARIOUS DISTRICTS

In the course of the discussion presented in the preceding pages, it has been disclosed—to use Mr. Murray's expression—"beyond peradventure of doubt" how untrustworthy are Mr. Murray's methods of dealing with various

subjects essential to his report. It has been observed, how, by mis-statement, misrepresentation, comparisons between non-comparable entities, garbling of documentary data, inflation of costs, and by other like processes, Mr. Murray in his report has sought to discredit the achievements of the hydro-electrical undertaking of the municipalities of the province of Ontario.

There remains an important feature of the subject under discussion to which the Hydro-Electric Power Commission desires to direct special attention, and that subject is the cost of electrical energy to the people of Ontario as supplied through the operations of their Power Commission. Mr. Murray devotes a portion of his report to such a discussion, and, generally speaking, he draws conclusions to the effect that throughout certain districts which he has selected in the state of New York, in the state of California and in the province of Quebec, the privately-owned electric utilities are selling electrical energy at less cost to the consumers than does the Hydro-Electric Power Commission.

Mr. Murray opens his discussion by stating

"The cost for power to the people as a whole must be that of the weighted average cost for energy delivered to the ultimate consumer."

Mr. Murray's conclusions, in so far as they relate to the cost to the consumers of electrical energy supplied by the operations of the Hydro-Electric Power Commission, are unreliable and cannot be accepted. Those who have followed, in the previous part of the present discussion, the disclosure of Mr. Murray's methods will have diffidence in accepting "weighted" costs if determined by Mr. Murray according to the manner of "weighting" which he has elsewhere employed. For example, it will be recalled, that although over twenty-five flats had been granted Mr. Murray found it convenient to lift the "weight" and stated that to date no flats had been granted; when statutory verbiage did not support his contention, he again removed the "weight" of certain words and put important statements out of balance; again, where interest charges were too low for Mr. Murray, he "weighted" them to the extent of a million and a half dollars, and similarly, with respect to the cost of power to the people, Mr. Murray's "weighted average cost" has clumsily been employed in order to create a fictitious basis of comparison. As a means of discrediting the great Hydro undertaking, such methods have truly been "weighed in the balances and found wanting."

Mr. Murray states:

"Unless all of the conditions surrounding published rates for the several classes of service are known, the comparison of prices resulting from these rates may be very misleading."

to which it may be added that, unless all of the essential factors employed by Mr. Murray in making his comparisons of costs for the several districts he compares are published, the absurdity of his comparisons cannot fully be dealt with.

In his letter in reply to a request from the Chairman of the Hydro-

Electric Power Commission for data missing from his report, Mr. Murray has explained that data received from certain private electric utilities have not been published because they are "confidential."

In seeking to establish his contention that privately-operated electric companies in the United States and in Canada are able to deliver power at lower rates to the people than do municipally-operated electric utilities in Ontario, Mr. Murray presents his comparison in respect to the costs of power in two main divisions. First of all, he discusses relative costs appertaining to a widespread or wholesale distribution of electrical energy by privately-owned utilities in various districts which *he* has selected, and second, he makes comparisons of the costs of power to the peoples residing in certain cities in the provinces of Ontario and Quebec, and in what Mr. Murray terms the Niagara power district of the United States.

With regard to his treatment of the subject in its relationship to the larger territorial sections, it should be understood that Mr. Murray has not sufficiently defined his districts, nor the populations which he respectively uses; he has not given proper summaries of the quantities of power involved, nor shown how, for the respective districts, his quantities are determined. In important instances, he has made comparisons between unlike units with the result that his conclusions, based upon such premises, are necessarily valueless and misleading. Time and again, Mr. Murray dogmatically asserts that certain comparisons which he is making give results of such and such *percentages* greater or less, as the case may be, than certain other quantities, but he does not present the basic quantities themselves, with the consequence that no one can tell how he arrives at *his* percentages.

By way of illustration of the vital significance of such omissions as have just been cited, it may be recalled how in an earlier part of this *Refutation* attention was drawn to the kind of comparison Mr. Murray is content to make in the case of California compared with Ontario. It was then seen that he had compared "that section of California analysed"—but which section was in no sense described—with Hydro territory "other than the Niagara district," and this latter he did not clearly differentiate. Similarly, when Mr. Murray is dealing with "the section of Quebec taken for comparison with the government electric utilities of Ontario," he states that the section involved in the comparison "is located in the St. Lawrence Valley, extending from the city of Quebec to the boundary between the province of Ontario and Quebec." He, however, has not defined the other limits of the section and one is left in doubt whether or not the valley on both sides of the St. Lawrence river is included. Further, the confines of the territory employed in the state of New York are not set forth.

Again, when Mr. Murray states in his report that

"In respect to the number of kilowatt hours served per capita, the private companies in Quebec deliver 84% more than does the Hydro-Electric Power Commission to its customers in Ontario."

he offers no explanation whatsoever of how he has derived such a percentage nor does he, either in this or in any other instance, set forth to what extent and in what manner he has, respectively, made use of the very large individual blocks of power supplied for electro-chemical and other purposes by private companies operating in the state of New York and in the province of Quebec. It is pertinent here to emphasize the fact that one large privately-owned company which, in 1920, generated a total of over 585,000,000 kilowatt-hours, supplied more than 60 per cent of this energy to one power customer. This represents for one of the private companies involved in Mr. Murray's comparison, a load supplied to a single customer of not less than 60,000 horsepower. If such large individual blocks of power supplied to one company be only treated as though supplied to a single customer, to a *per capita* of one, it is clear that *per capita* quantities deduced by the incorrect "weighting" of such quantities could yield no truly significant conclusion. On the contrary the deductions would be woefully misleading.

It is unnecessary to multiply illustrations. It certainly is not fitting in a report claiming to be "impartial and exhaustive" that data respecting the confines of districts employed in comparisons should be suppressed, that no explanation should be given as to how total quantities of power generated or supplied to customers have been determined, or as to what quantities have been employed for the deduction of *per capita* units and so on. Mr. Murray's methods, as exposed in the previous portion of this *Refutation*, amply justify any one in refusing to accept his dogmatic assertions respecting the relative cost of power.

It is definitely known that his representations are incorrect, but in view of the fact that so many essential factors have been withheld and that other data of the privately-owned companies have, according to Mr. Murray's statement, been retained as "confidential," it is obvious that Mr. Murray's discussion of the comparative cost of power for the larger districts he selects is unworthy of further attention.

Mr. Murray's comparison of the cost of electrical energy to the people residing in certain cities in the provinces of Ontario and Quebec and in the Niagara power district of the United States will next be considered.

**Mr. Murray's Erroneous Comparison of Costs of Power
in the City of Buffalo and the City of Toronto**

The criticism already made respecting the failure of Mr. Murray to present the basic data necessary to any proper consideration of his statements relating to the cost of power to the people in the various large districts, applies also to the comparisons which Mr. Murray makes of the cost of power in the large cities to which he specially refers.

In only one instance, namely, in the case of his comparison of the city of Buffalo with the city of Toronto, has it been possible to make an independent investigation of the relative average cost of all the power sold to the people. Even in the case of these cities, however, there are a number of conditions which tend to unbalance the comparison. For example, Niagara power has

to be transmitted to Toronto over a distance four times greater than the distance over which Niagara power has to be transmitted to Buffalo. The distributing company in Buffalo has no competition, whereas, in Toronto there are two competitive operating systems. The effect of this competition is that each of the electric systems in Toronto has had to erect, operate and maintain a separate distribution system for the city, but the total energy marketed and the total revenue received are divided between the two systems; also distribution in Toronto is more extensive than is the case in Buffalo. These and other factors would naturally cause the cost of distribution per horsepower or per kilowatt-hour to be higher in Toronto than would otherwise be the case. Consequently, in having selected Toronto for comparison with Buffalo, Mr. Murray has chosen a city where special conditions make the cost of local distribution to the ultimate consumer relatively much higher than the cost which appertains generally throughout the municipal hydro-electric undertaking of the Province.

Notwithstanding the handicaps under which the Toronto Hydro-Electric System operates as compared with the Buffalo General Electric Company, it is demonstrable that the cost of electrical energy to the people served by the Toronto Hydro System is *less* than the cost of electrical energy to the people of Buffalo.

Upon examination, Mr. Murray's comparison of the "cost of power" in the cities of Toronto and Buffalo is found to be very inaccurate. Mr. Murray's representation, that the cost of power in 1920 to the people of Buffalo was 20 per cent *less* than in Toronto, cannot be substantiated, for, as a matter of fact, the average cost of energy in Buffalo, in 1920, was actually *higher* than in Toronto. Moreover, with the exception of certain specially favored, large power consumers in Buffalo, the cost of electrical energy distributed in Toronto is less than in Buffalo for every kind of service.

The artifice which Mr. Murray employs to obtain the fictitious results to which he has given publicity, is to compare the "weighted average cost for energy" in the two cities, *but he uses different systems of weights for each city.*

A fair and simple method by which to effect a reliable comparison of the average cost of electrical energy in Toronto and in Buffalo is to ascertain the total amounts which would be paid in the two cities combined; *first*, if all of the energy sold in the two cities were charged at the average rates of the Toronto Hydro-Electric System for each class of service, and *second*, if the same energy were charged at the average rates of the Buffalo General Electric Company for the same classes of service. By this method neither city can have any advantage, because the total amount of energy under consideration in each class is the total actually supplied in the two cities. Inasmuch as the average rates at which the energy is sold are, in each instance, applied to precisely the same quantities of energy for the respective classes of service, the totals will, of course, be representative of the average rates charged for the total energy supplied. This method permits proper cognizance to be taken of the different distributing costs applicable for various classes of service. In

Toronto, for example, the average rate per kilowatt-hour for lighting service is about 2.22 cents, while the average rate for power service is 1.01 cents. In Buffalo the average rate ranges from 3.73 cents for lighting to 0.76 cent for power. Obviously, it is essential to take proper account of these differences in rates, and this is accomplished by dealing individually with the respective amounts of energy and average rates for each class of service, whether it be for lighting, power, or municipal service.

Authentic data for making this comparison are available from the latest published report (1922) of the Public Service Commission of the Second District of the state of New York, which contains records for the city of Buffalo for the year 1919,*—the last year published; and from the returns of the Toronto Hydro-Electric System for 1920, as checked by two independent audits. In determining the average rates for the various classes of service, taxes have not been deducted, because the amount which the Toronto Municipal Treasury, in 1920, saved on the cost of its municipal electric services was more than the amount of taxes from which the Hydro system was exempted. A true comparison then of the average cost of all the electrical energy sold to the people of Buffalo served by the Buffalo General Electric Company, and to the people of Toronto served by the Toronto Hydro-Electric System, calculated at the Toronto average costs for each class of energy and then at the Buffalo average costs respectively for the same classes of energy is presented in the following table:

TABLE IV

AVERAGE COST OF ELECTRICAL ENERGY IN THE
CITY OF TORONTO AND IN THE CITY OF BUFFALO

TORONTO HYDRO-ELECTRIC SYSTEM—BUFFALO GENERAL ELECTRIC COMPANY

Class of Service	Total Kilowatt- Hours Toronto and Buffalo	Average Cost to the People per Kilowatt- Hour		Cost of all the Energy Used by the People of Toronto and Buffalo	
		Toronto cents	Buffalo cents	At Toronto Average Rates	At Buffalo Average Rates
Lighting.....	109,346,000	2.22	3.73	\$2,427,000	\$4,080,000
Power and Railway	509,591,000	1.01	0.76	\$5,147,000	\$3,870,000
Municipal.....	33,607,000	1.66	3.24	\$ 558,000	\$1,090,000
Totals.....	652,544,000			\$8,132,000	\$9,040,000
Averages.....		1.25	1.38		
Total Omitting Railway Power.....	571,480,000			\$7,185,000	\$8,710,000
Average Cost Omitting Rail- way Power.....		1.26	1.52		
Revenue Applied on Capital Account.....		0.16	.....	
Net Average Cost of Energy		1.10	1.52		

NOTE: Power used in Toronto for municipal waterworks pumping has been included as "power" rather than as "municipal service" since there is no corresponding item included in the municipal electric service supplied by the Buffalo General Electric Company.

*Mr. Murray's comparison is for 1920 in both cities; as, however, his diagrams show that the cost of power in Buffalo was higher in 1920 than in 1919, a comparison of Buffalo and Toronto prices, both in 1920, would give a result even more favorable to Toronto than the present comparison.

From the data presented in the foregoing table, it is seen that the cost of electrical energy to consumers in Buffalo is not, as Mr. Murray alleges, 20 per cent *lower* than in Toronto, but the Buffalo costs are *higher* than those in Toronto by at least 10 per cent.

The Toronto Hydro-Electric System for railway purposes only supplies four small civic lines in scattered outlying parts of the city. The number of kilowatt-hours sold in Buffalo for railway purposes is thirteen times greater than that supplied by the Hydro-Electric System in Toronto. If, therefore, the power sold for railways in both cities be eliminated—because of the non-comparable extent and costs of this class of service—then, for all other classes of consumers, the average cost of electrical energy in Buffalo becomes 21 per cent *higher* than in Toronto.

As has previously been explained, the people of Toronto, in their rates for electrical energy, are gradually paying for the cost of the installation required for the service supplied them; and thus, in thirty years, they will own their distributing system as well as a large share of the generating and transmitting plant and equipment common to all the municipalities in the system. This additional charge together with the surplus, in 1920, amounted to over 1.6 mills per kilowatt-hour. This is essentially not a part of the cost of power as usually understood, but constitutes an investment which still belongs to the people, and will return dividends in the form of lower power costs in the future. If this amount together with the non-comparable railway power be excluded, then the cost of electrical energy in Buffalo is at least 35 per cent *higher* than in Toronto.

From the comments just made, it is clear that in the only one of his comparisons which Mr. Murray made it possible to check, namely, the relative costs of electrical energy in Toronto and Buffalo, the facts are found to be the reverse of what Mr. Murray has stated. Instead of being 20 per cent *less* as Mr. Murray contends, the cost of electrical energy in Buffalo is a great deal *higher* than in Toronto.

Discrimination in the City of Buffalo Against the Lighting Consumer

From the table on page 47, it appears that while in Buffalo the average costs to the people per kilowatt-hour are *higher for lighting and for municipal services*, yet the average rate paid per kilowatt-hour for *power is lower* in Buffalo than in Toronto. The returns of the Buffalo General Electric Company published by the New York State Public Service Commission, indicate that marked discrimination is made in Buffalo in favor of the power consumers as against the domestic and commercial lighting consumers, and even against the city.

In Toronto, under Hydro administration the rates are calculated to conform, as nearly as possible, to the actual cost of serving *each* class of consumer. Therefore, it is evident that in Buffalo the *power* consumers receive their service at *very close to cost*, while the *domestic and commercial* consumers and the city of Buffalo itself, appear to pay a great deal *more than cost*. This is discrimination. Moreover, while on the average of kilowatt-hours the power

consumers pay very low rates—even lower than in Toronto, yet it can be shown that even within the class of power consumers similar discrimination occurs,—the great mass of power consumers, who take less than say 1,000 horsepower each, paying much higher rates than those paid by similar power consumers in Toronto. This will be evident from the tables which follow, giving actual bills for consumers of all classes in Toronto, recalculated according to the published schedules of rates in Buffalo and other cities. The high rates paid in Buffalo for small quantities of power are, however, completely overshadowed in the *average* cost by a few very large power consumers favored with exceptionally low rates. For instance, the low rates of a single actual large power consumer in Buffalo lower the *average* cost per kilowatt-hour by ten per cent, and the combined effect of the rates charged to this and other large power consumers is to produce the average rate of 0.76 cents as shown in the table above.

It is therefore evident that not only are the costs of power to all consumers *on the average* much higher in Buffalo than the corresponding average cost of power in Toronto, but, with the exception of a few specially favored very large consumers of power, the average cost of electrical energy to the people is much higher in Buffalo *for every class of service*—whether it be domestic lighting, commercial lighting, power or municipal services—than it is in Toronto under the operation of the Toronto Hydro-Electric System.

**Comparisons of Actual Bills to Ultimate Consumers in
Toronto, Hamilton, London, Montreal, Buffalo and Detroit**

In spite of anything which Mr. Murray has said, or may say, the usual way, and indeed the one which naturally appeals to the average citizen, of determining how much his electrical service costs, is for him to consult his own bills which regularly come in from those who supply the service.

In order to afford an opportunity of making comparisons upon a basis of rates actually charged, there is below submitted a set of tables which show the amounts which, respectively, have to be paid per annum for electric light and power in the three large cities which Mr. Murray has mentioned, namely, the cities of Toronto, Montreal and Buffalo. As interesting comparisons, there have also been added the corresponding data for one other city in the United States,—Detroit, and for the two cities of London and Hamilton in the province of Ontario.

STATEMENT IN REFUTATION

COMPARISONS OF YEARLY BILLS FOR ELECTRICITY

Calculated at the Rate Schedules in Force in the Cities of Toronto, Hamilton, London, Montreal, Buffalo and Detroit in 1920

Actual Cases from Toronto Billing

TABLE V—DOMESTIC LIGHTING AND COOKING

Municipality				Toronto	Hamilton	London	Montreal	Buffalo	Detroit
Case	Floor Area	Rooms Charged for	Yearly Kilowatt-hours	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill
				\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
1	1000	3	357	9.33	9.33	9.33	18.93	24.99	22.57
2	"	3	582	11.69	11.69	11.69	29.74	34.08	30.67
3	"	3	2313	27.30	27.30	27.30	60.49	135.72	92.99
4	1600	4	132	7.56	7.56	7.56	8.14	12.00 min.	16.63
5	"	4	373	11.99	11.99	11.99	19.70	25.72	26.39
6	"	4	5365	58.65	58.65	58.65	112.27	268.60	206.10
7	3000	5	430	17.44	17.44	17.44	22.44	30.10	31.68
8	"	5	1704	34.12	34.12	34.12	83.56	78.33	77.54
9	"	5	3005	45.97	45.97	45.97	76.87	174.20	124.38

TABLE VI—COMMERCIAL LIGHTING

Municipality			Toronto	Hamilton	London	Montreal	Buffalo	Detroit
Case	Installed Capacity Kilowatts	Yearly Kilowatt-hours	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill
			\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
10	0.9	895	30.43	16.37	21.94	44.76	55.24	54.86
11	0.9	818	27.57	15.54	20.56	41.06	52.16	61.39
12	1	1,630	42.45	20.88	29.63	80.04	86.80	89.55
13	5	2,711	105.16	66.54	81.20	131.93	189.77	203.00
14	6.4	5,470	192.66	106.77	139.93	264.36	357.04	349.83
15	6	23,873	357.60	140.48	228.50	1147.70	811.70	936.17

TABLE VII—POWER SERVICE, SMALL LOADS

Municipality			Toronto	Hamilton	London	Montreal	Buffalo	Detroit
Case	Connected Load Horse-power	Yearly Kilowatt-hours	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill
			\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
16	5	1,162	88.77	48.26	55.14	83.24	111.34	213.43
17	6.5	4,750	139.11	86.92	105.05	168.75	249.38	339.01
18	5	3,573	103.03	66.36	80.11	128.60	191.06	259.24
Case	Connected Load Horse-power	Yearly Kilowatt-hours	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power
			\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
16	5	1,162	17.75	9.65	11.03	16.65	22.25	42.68
17	6.5	4,750	21.40	13.37	16.16	25.90	38.37	52.16
18	5	3,573	20.61	13.27	16.02	25.72	38.21	51.85

TABLE VIII—POWER SERVICE

Municipality			Toronto	Hamilton	London	Montreal	Buffalo	Detroit
Case	Average Demand Horse-power	Yearly Kilowatt-hours	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill	Yearly Bill
			\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
19	121.7	103,900	2,398.74	1,722.19	2,094.98	2,864.50	2,853.22	5,195.80
20	48.83	66,700	1,080.10	724.46	882.71	1,358.93	1,502.74	2,764.93
21	92.6	356,660	2,852.92	1,580.40	1,922.53	3,727.90	4,990.04	9,042.07
22	347.5	399,700	6,808.79	5,088.11	6,200.85	9,209.50	8,843.23	15,977.98
23	709.2	837,740	14,868.06	10,403.98	12,678.86	19,015.40	18,080.48	32,604.86
24	616.7	1,559,000	15,625.35	9,795.84	11,922.14	20,745.70	24,051.08	43,351.94
Case	Average Demand Horse-power	Yearly Kilowatt-hours	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power	Per Horse-power
			\$ c	\$ c	\$ c	\$ c	\$ c	\$ c
19	121.7	103,900	19.71	14.15	17.21	23.54	23.44	42.69
20	48.83	66,700	22.12	14.84	18.08	27.83	30.77	56.62
21	92.6	356,660	30.81	17.06	20.76	40.26	53.89	97.65
22	347.5	399,700	19.59	14.64	17.84	26.50	25.45	45.98
23	709.2	837,740	20.96	14.67	17.87	26.81	25.49	45.97
24	616.7	1,559,000	25.43	15.88	19.33	33.64	39.00	70.30

The very great differences which exist in the amounts charged for the same kind of service to the ordinary consumer in all classes, in the Ontario cities of Toronto, Hamilton, and London, as compared with Montreal, Buffalo and Detroit, are well brought out in the above tables.

By comparing the Toronto bills with the corresponding bills in Hamilton and London, it will be seen that, on account of conditions which have already been explained, Toronto consumers pay relatively higher rates than do the consumers in Hamilton or London. Mr. Murray, therefore, selected for *his* comparison a city which is far from representative of normal Hydro operation.

Comparing the bills in the Ontario cities with the corresponding bills in Montreal, Buffalo and Detroit, the disparity in the costs of electrical service is very evident. Almost without exception, the bills in Toronto, Hamilton and London are lower than the bills for corresponding service in Montreal, Buffalo and Detroit. From the preceding tabular data it is seen that the differences between Hamilton bills and those in cities under private ownership, range from 5 to 600 per cent in the case of Montreal, from 50 to 400 per cent in the case of Buffalo, and from 75 to 500 per cent in the case of Detroit.

In the face of such facts as are illustrated by these tables of actual consumers' bills,—and also by the table on page 47—it is astonishing that Mr. Murray should have failed to perceive the absurdity of denying the fact that the cost of electrical energy to the people is lower in Ontario under municipal ownership than it is in other places served by private electric utilities. Mr. Murray's method of comparison simply produces fictitious results and inasmuch as he has employed the same method throughout his comparisons of the cost of power, his other comparisons also may be dismissed as meaningless.

CONCLUSION

In entering upon this discussion of the true character of the "Murray Report," it was charged that, in addition to misrepresenting the achievements of the Hydro-Electric Power Commission of Ontario, Mr. Murray has made grossly incorrect and misleading statements; he has garbled documentary and other data and then employed them as premises from which to derive conclusions; he has made pronouncements based upon comparisons so inadequate as to be puerile; he has made charges which he fails to substantiate; he has ignored important factors, even disregarding most pertinent engineering data; he has seriously miscalculated the cost of Niagara power; he has omitted to describe the confines of districts he discusses; he has not shown how summaries have been derived; he has made comparisons between unlike units; with respect to the costs of power, he has shown himself singularly lacking in the application of engineering economics; and he has failed to supply data essential to the integrity of the claim of reporting in an "exhaustive and impartial" manner. In a word, it was charged that Mr. Murray had employed methods demonstrably reprehensible and unprofessional.

This charge has now been substantiated by representative instances selected from the mass of such material to be found in the "Murray Report." The varied character and comprehensive range of the subjects specifically dealt with is well disclosed by glancing over the table of Contents of this Refutation.

When it is realized that over 300 municipalities have invested more than \$200,000,000 in their Hydro enterprise, and when one considers the great value of the co-operative efforts which have resulted in the distribution of electrical energy at cost to over 1,000,000 citizens, it is inexcusable that this undertaking should be subjected to such an unwarranted attack as the National Electric Light Association of New York has made through the agency of the "Murray Report." In view of the special and widespread publicity given to the "Murray Report," it became desirable to issue this authoritative statement in reply.

Inasmuch as the "Murray Report" has been shown to be permeated by misrepresentations and unjust statements, it is, after all, seen to be but one more of those impotent attempts which, from time to time, have been made to discredit the outstanding achievements of the co-operating hydro-electric municipalities of the province of Ontario.

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